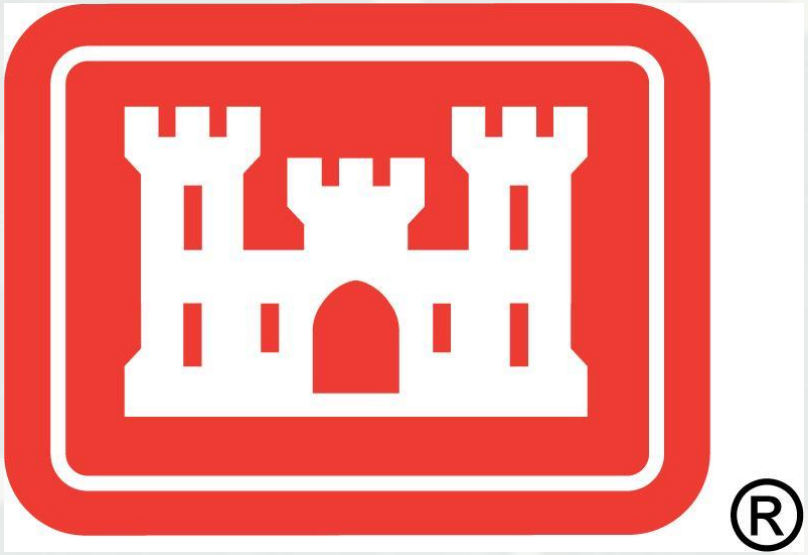
Civil Works Overview

Dartmouth ILEAD – 2011-04-07



Stephen P. Gaughan

Physical Scientist

RS/GIS & Water Resources Branch

CRREL-USACE

7 April 2011

USACE Mission Statement

- Provide vital public engineering services in peace and war to strengthen our Nation's security, energize the economy, and reduce risks from disasters.

Relevant

Ready

Responsive

Reliable

Corps Motto: "Essaysons"
French for "Let us try", origins in French military engineers helping the young group of new US Army Corps of Engineers during the Revolutionary War.

U.S. Army Corps of Engineers' Vision

- A GREAT engineering force of highly disciplined people working with our partners through disciplined thought and action to deliver innovative and sustainable solutions to the Nation's engineering

ERDC Mission Statement

- Make the world a better and safer place

CRREL Mission Statement

- Solve interdisciplinary, strategically important problems of the US Army Corps of Engineers, Army, DOD, and the Nation by advancing and applying science and engineering to complex environments, materials, and processes in all seasons and climates, with unique core competencies related to the Earth's cold regions.

Relevant

Ready

Responsive

Reliable

Corps Motto: "Essaysons"
French for "Let us try", origins in French military engineers helping the young US Army Corps of Engineers during the Revolutionary War.

Topics

- History of the Corps of Engineers
- Civil Works Mission of the Corps
- Overview of Civil Works Business Areas
- CRREL's role in Civil Works
- Current Areas of Focus
- Conclusion & Questions

History

When was the US Army Corps of Engineers established?

- Massachusetts National Guard, 1636, Engineer Battalion (101st)
- Congress organized the Continental Army in 1775 it established a Chief Engineer
- Colonel Richard Gridley of Massachusetts had experience in the design and construction of batteries and fortifications
- Succeeded by Rufus Putnam, also of Massachusetts

- May 11, 1779 Congress passed a resolution forming the Corps of Engineers within the Continental Army
- Geographers and Topographic Engineers added, 1780 – 1818
- River works began after the War of 1812, fortifying New Orleans

- West Point established to train officers and engineers, late 1700's, Thomas Jefferson signed legislation in 1802, and the United States Military Academy was under the direction of the Corps

Civil Works

History of Civil Works

- Water Resources
  - Navigation for commerce and defense of coastlines, harbors and inland waterways – maintaining and improving channels
  - Federal laws in 1824 for the Ohio and Mississippi Rivers

History of Civil Works

- Water Resources, mid 1800's
  - US Army Corps of Topographic Engineers authorized by Congress on July 4th, 1838
  - Mapping, design and construction of federal civil works projects
  - Lighthouses, coastal fortifications, navigational routes
  - Surveying of the Great Lakes

History of Civil Works

- Civil war
  - In addition to military construction, civil construction of pontoon bridges and railroad bridges
  - Bridges provided access to resources and industry for economic success and military supply routes

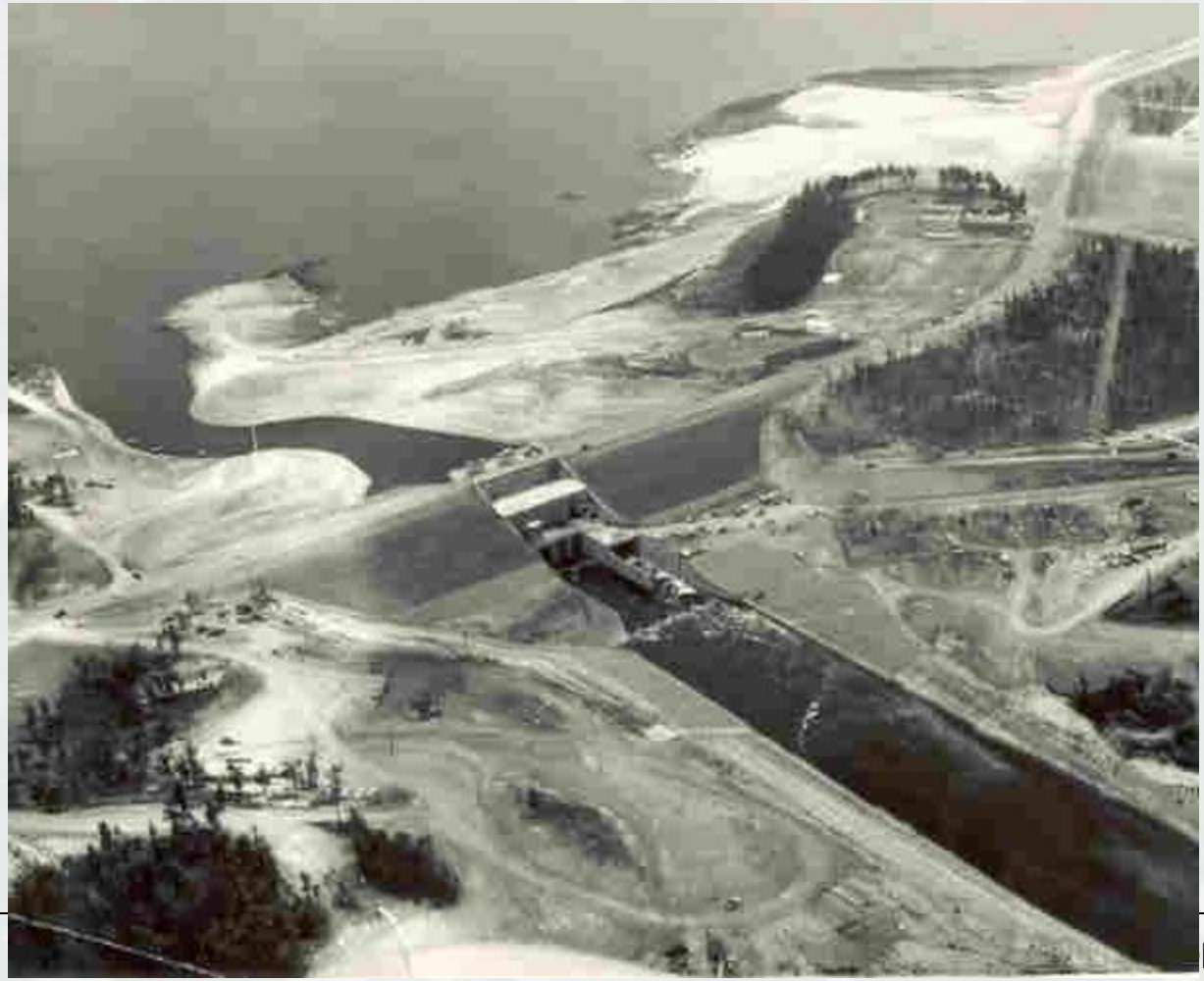
History of Civil Works

- Flood Control
  - ► Mississippi Flood of 1927
    - "Six feet of water in the streets of Evangeline", "Louisiana 1927" by Aaron Neville
    - Corps authorized to do flood control work on Mississippi River
  - ► Flood Control Act of 1936
    - Corps authorized to add flood control work nationwide as part of its mission

History of Civil Works

- Hydroelectric Power
  - Corps authorized to build hydroelectric power plants in the 1920's
  - USACE is the fifth largest provider of electric power in the U.S.

1956-1965 Hydropower development, Fort Worth District



History of Civil Works

- Water Supply
  - In the 1850's Corps built the Washington Aqueduct to bring water to Washington, DC area
  - Corps reservoirs supply water for 10 million people in 115 cities, as well as agricultural land for food production

History of Civil Works

- Environment
  - ▸ Wetlands
    - Their health is integral to flood control and water management
  - ▸ Base Closure and Realignment, began in 1988
  - ▸ Formerly Used Defense sites being cleaned up and returned to public and private use

History of Cold Regions Research

- 1944, US Army Corps of Engineers
  - New England Division, Frost Effects Laboratory based in Boston Massachusetts, 1944, some affiliation with MIT
  - St. Paul District Permafrost Division, 1944, to construct airfields on permafrost (Alaska, etc)

History of CRREL

- Snow Mechanics Laboratory proposed in 1947
- Snow, Ice and Permafrost Research Establishment (SPIRE) in Wilmette, Illinois in 1951

History of CRREL

- SPIRE and FEL merged to Boston
- 1959, Camp Century in Greenland on the Greenland Ice Cap
- CRREL was formed out of SPIRE in February 1961

History of CRREL

- CRREL performs work primarily in the Arctic, Antarctica, Alaska and the Great Lakes
  - Climatic history data
  - Resource extraction
  - Runways and construction
  - Extending winter navigation

History of CRREL

- 1967 – Oil discovered on north slope of Alaska's Brooks Range
  - How to extract oil from frozen terrain (permafrost)
  - How to transport crude oil to the continental U.S. for refinement

History of CRREL

- Great Lakes Navigation, 1970's
  - St. Lawrence Seaway
  - Icing problems in locks
  - Floating ice

History of CRREL

- South Pole Research Station
- Greenland Icecap, ice core research
- RSGIS, 1990’s
- Permafrost research, Alaska
- Fairbanks, Alaska permafrost tunnel

General Robert Van Antwerp, Chief of Engineers

USACE Civil Works

- 36,000 Civilian and Military personnel
- Federal Agency and a Major Army Command
- Current Chief of Engineers is three-star General Robert L. Van Antwerp

Civil Works

- Dams
- Canals
- Flood Protection
  - Levees
  - Flood Gates / Storm Surge Gates
  - Regulation of waterways and wetlands
- Environmental Protection, Conservation and restoration

Civil Works

- Hydropower:
  - The Corps provides 24% of the US Hydropower capacity

Civil Works Projects: Water Resources

Relevant

Ready

Responsive

Reliable

Construction on US Army bases & forts

Dr. Robert Davis, Current Director of CRREL

Mission

Civil Works Mission and Vision: Dedicated to providing quality, responsive service to the nation in peace and war. The Directorate of Civil Works is a major component of the U.S. Army Corps of Engineers. The Civil Works programs include water resource development activities including flood control, navigation, recreation, and infrastructure and environmental stewardship. Our mission also includes emergency response.

- Construction & Engineering for the US Army
- Hydropower
- Emergency Response and Management
- Water Resources - Flood Control
- Navigation
- Water Resources – Recreation
- Infrastructure and Environmental Stewardship

Mission - continued

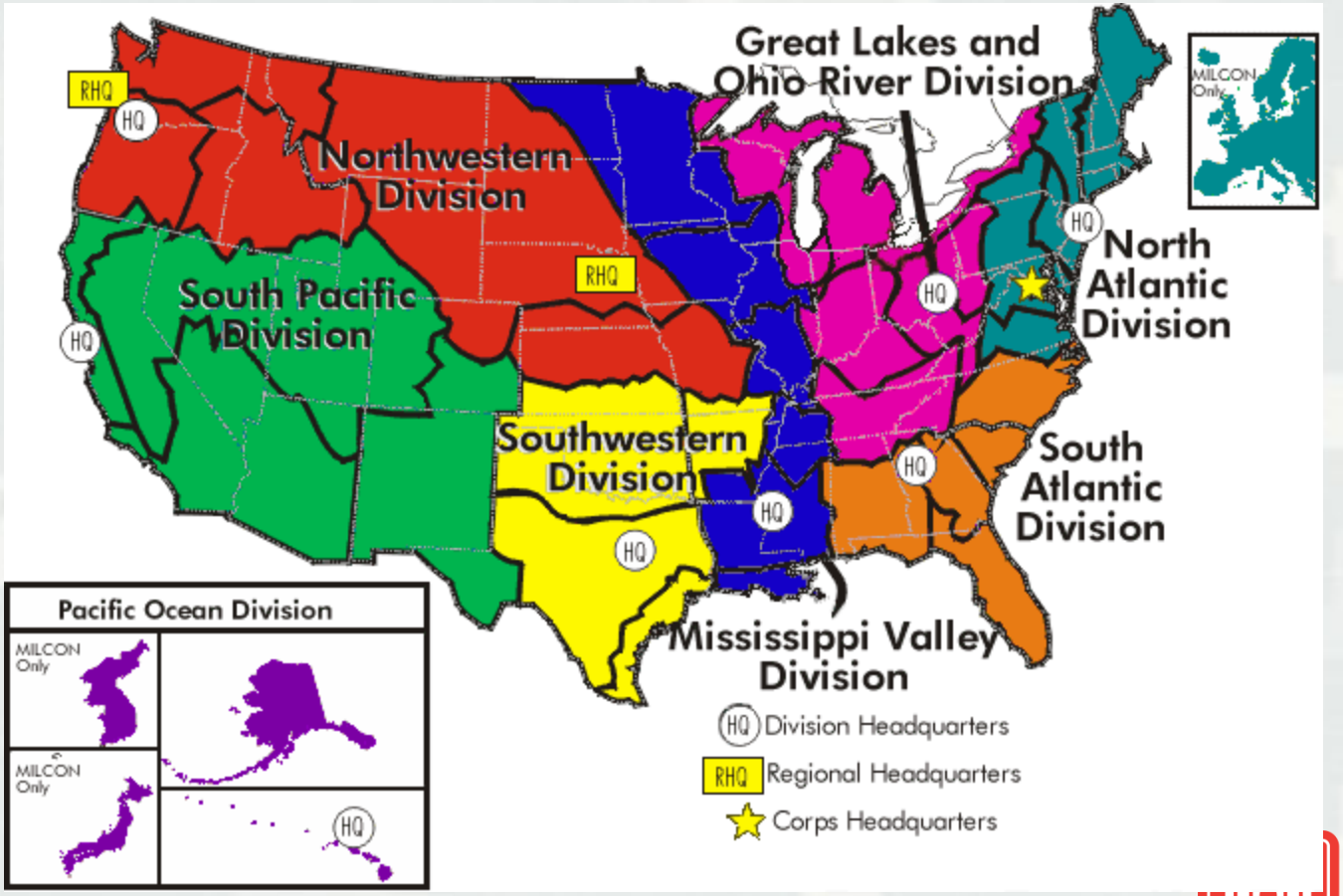
- Construction & Engineering for the US Army
- Planning
- Regulatory – wetland & waterway permitting
  - National Wetlands Plant List
- Dams and Levees
  - Levee Safety program
  - National Inventory of Dams
  - National Levee Database
  - Hydropower

Mission - continued

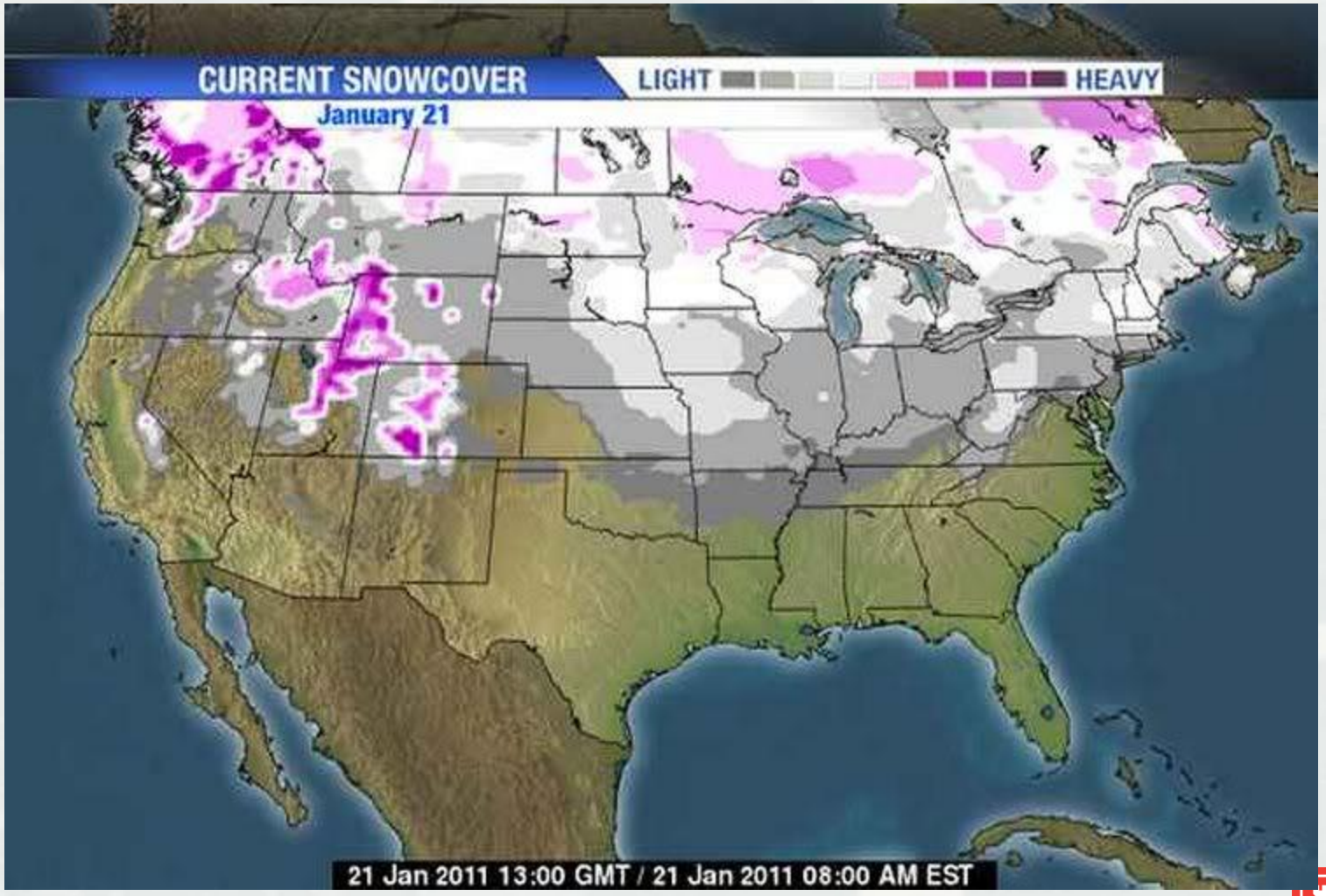
- Emergency Response and Management
  - Flood Control
- Navigation
  - Inland Electronic Navigation Charts
- Water Resources – Recreation
- Infrastructure and Environmental Stewardship
  - green building – LEED Certified
  - environmental conservation on US Army & US Army Corps lands

Civil Works Divisions and Districts

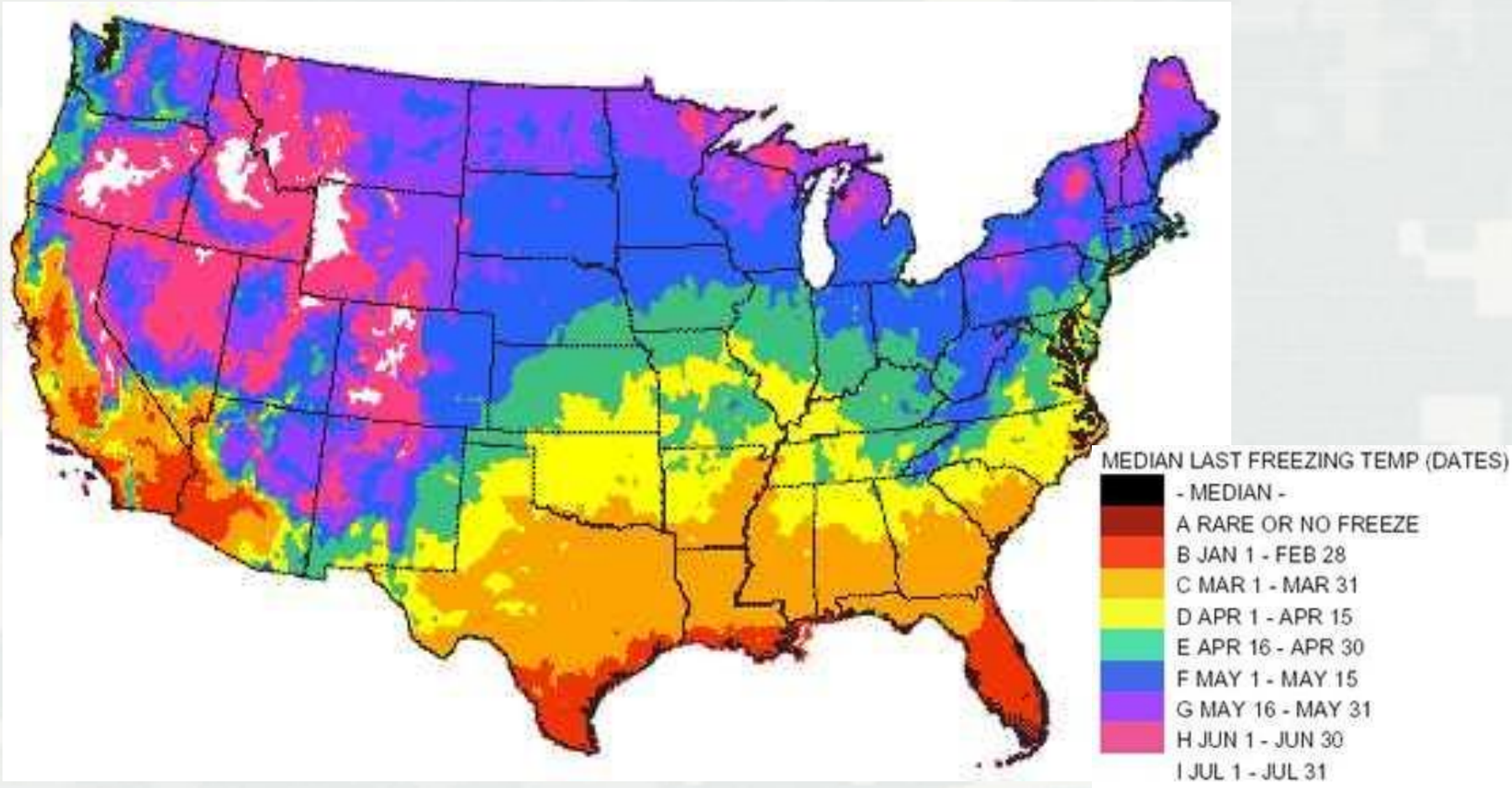
- Districts (watershed / HUC boundaries)
- Divisions



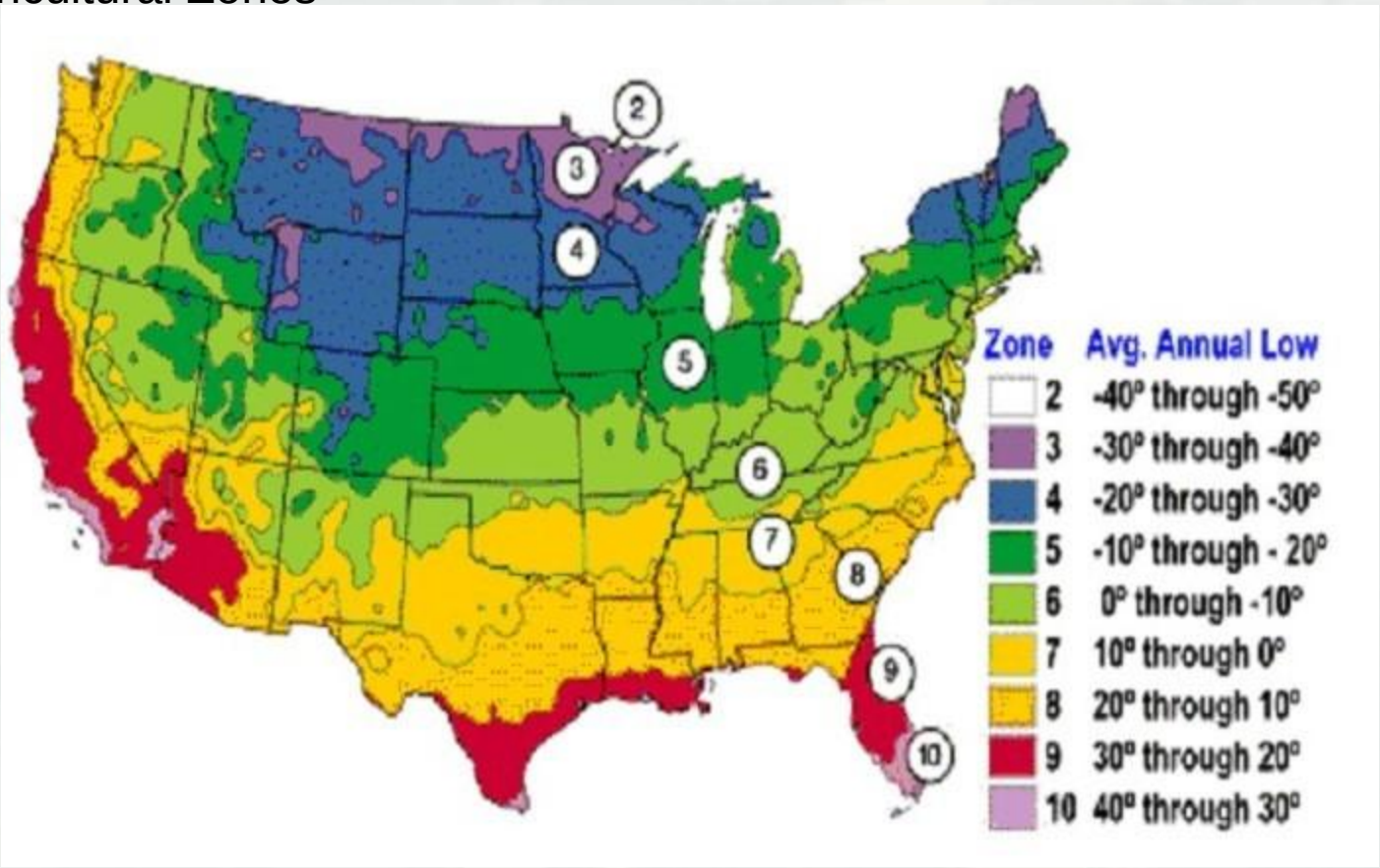
Over 70% of U.S. has winter snow cover



Freezing Temperatures Map



Agricultural Zones

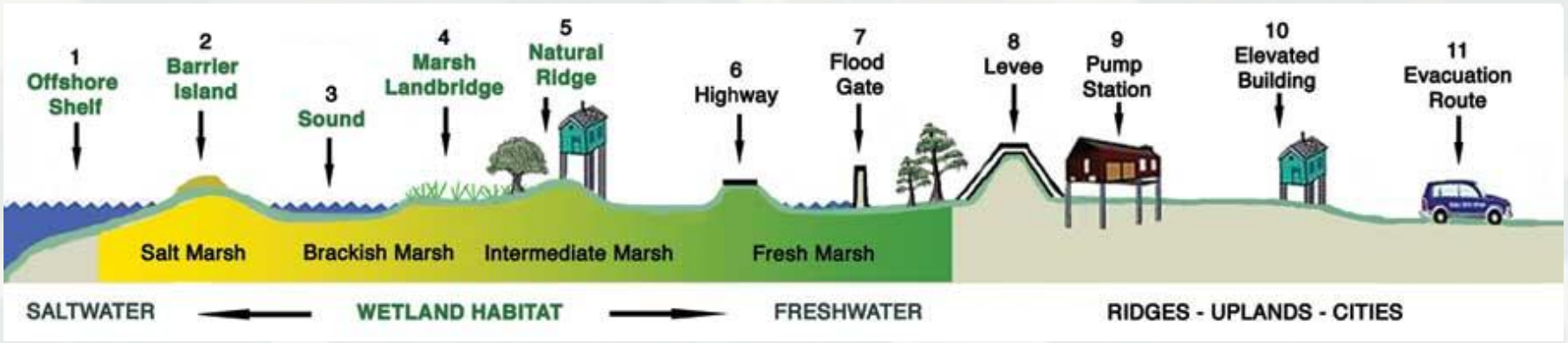


Civil Works Divisions and Districts

Lake Borgne Surge Barrier – Mississippi River Gulf Outlet

Civil Works Divisions and Districts

Lake Borgne Surge Barrier – Mississippi river Gulf Outlet

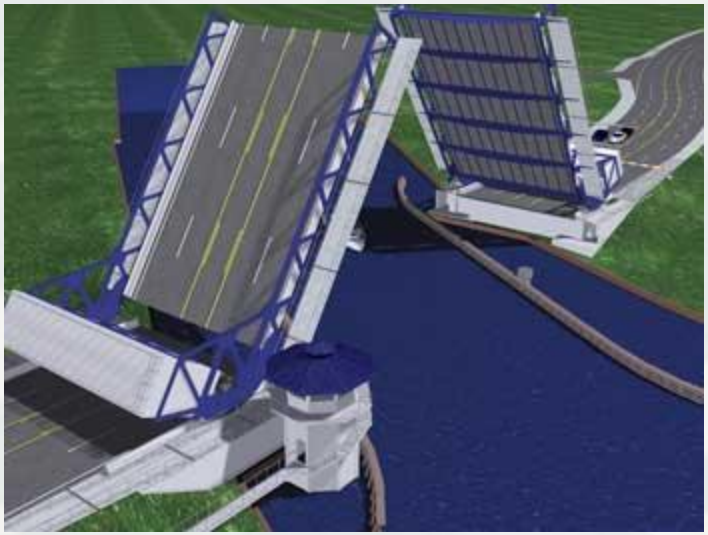

1
Offshore
Shelf
2
Barrier
Island
3
Sound
4
Marsh
Landbridge
5
Natural
Ridge
6
Highway
7
Flood
Gate
8
Levee
9
Pump
Station
10
Elevated
Building
11
Evacuation
Route
Salt Marsh
Brackish Marsh
Intermediate Marsh
Fresh Marsh
SALTWATER
WETLAND HABITAT
FRESHWATER
RIDGES - UPLANDS - CITIES

Civil Works Divisions and Districts

Truman Dam, Kansas City District – Hydropower & flood control

Civil Works Divisions and Districts

LEED Green Building design for USACE and Army buildings



Norfolk District – Great Bridge design

Civil Works Divisions and Districts

Beach nourishment – placement of dredged sand offshore, where wave action will rebuild beaches

Dredging – Port of Anchorage, Anchorage, AK

Civil Works Divisions and Districts

Dredging – maintenance of federal channels for shipping, navigation and recreation
-removal of hazards in federal channels and waterways

-Environmental Restoration – native Virginia oyster restoration (c. Virginica)

Civil Works: Water Resources

- Coastal Protection
- Disaster Preparedness and Response
- Environmental Protection and Restoration
- Flood Protection
- Hydropower
- Navigable Waterways
- Recreational Opportunities
- Regulatory Oversight
- Water Suppy

Civil Works – Hot Topics

- Levees & Dams
  - Levee Safety Program
  - National Inventory of Dams
    - Federal, State, Local, Private
  - National Levee Database
    - Federal, State, Local, Private
- Katrina Recovery
- 100-year storm protection for New Orleans
- Gulf Recovery – Hurricanes & BP / Deep Horizon Oil Spill

CRREL and Civil Works

- CRREL, located in Hanover, is one of seven labs that make up the “Engineer Research and Development Center (ERDC) headquartered in Vicksburg, MS
  - Why Vicksburg? The location dates back to the creation of the “Waterways Experiment Station” that was established after major flooding on the Mississippi River in 1927
- ERDC has a science and technology director as well as a Colonel (currently Colonel Kevin J. Wilson)

CRREL and Civil Works

- ERDC leaders report to USACE Headquarters and General Van Antwerp, Chief of Engineers
- CRREL performs Civil Works projects primarily related to cold environments. Some of these include
  - Flood control when snow and ice are involved
  - Flood prediction in cold climates
  - Basic research in snow, ice and permafrost

Corps by The Numbers

- Owns and operates 169 Dams
- 8 Divisions and 45 Districts
- Owns or operates 257 navigation lock chambers at 212 sites
- Owns and operates 24% of US Hydropower (3% of US electric capacity)

Corps by The Numbers

- Operates and maintains 12,000 miles of commercial inland navigation channels
- Lead government agency on Inland navigation channels and bathymetry (White House Office of Management and Budget (OMB) document “Circular A-16” states this for the executive branch authority

Corps by The Numbers

- Maintains 926 harbors (coastal, Great Lakes and inland harbors)
- Dredge 255 million cubic yards annually for construction and maintenance
- Dredging Operations Technical Support Program (DOTS) provides direct technical support the Corps' dredging operations (Operations & Maintenance) – technology, environmental impact, etc

Corps by The Numbers

- Corps of Engineers operates and maintains more recreation areas than the National Park Service
  - Boating and fishing
  - Beaches and Swimming
  - Campsites
  - Hiking trails
  - Nature & Natural Resource Education

Corps by Authorizations and Appropriations

- Authorizations from Congress:
  - What work Congress *tells* us to perform (what it wants done)
- Appropriations from Congress:
  - What Congress *pays* for us to carry out (what they appropriate for the work to actually be performed by the Corps or it's contractors

CRREL and ERDC

- The US Army Corps of Engineers Cold Regions Research and Engineering Laboratory (CRREL) is located at 72 Lyme Road in Hanover, NH
- In 1999, CRREL became part of the “Engineer Research and Development Center” (ERDC) in Vicksburg, Mississippi
- ERDC grew from the “Waterways Experiment Station” (WES)

ERDC

- Frequent winner of the “Army Research Laboratory of the Year”

1927

- The Great Mississippi Flood of 1927, the worst in U.S. History, showed the failure of control mechanisms (levees) on the Big River

1929 - Corps of Engineers Research

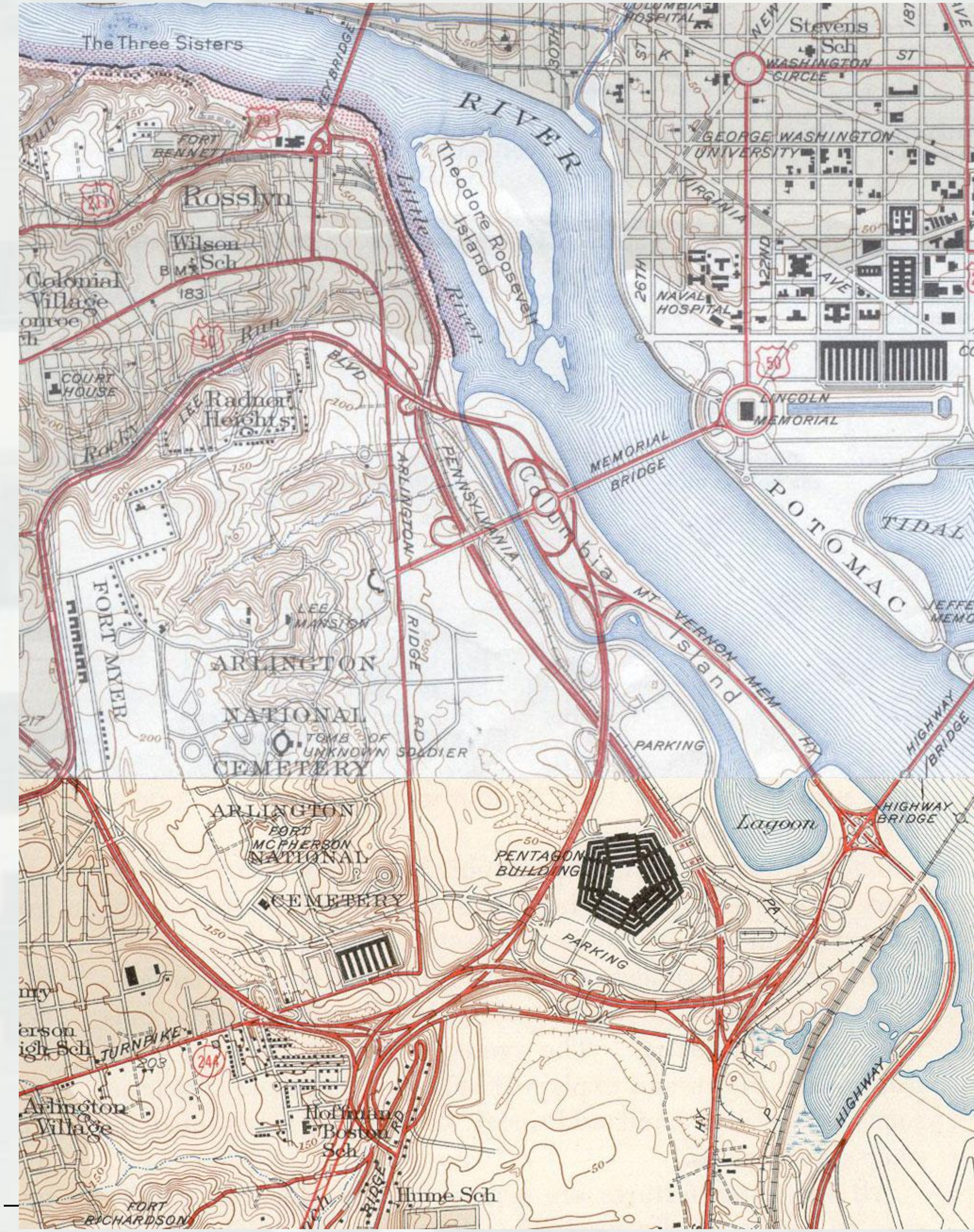
- The Waterways Experiment Station (WES) was founded in 1929 to support both Civil and Military missions of the Corps of Engineers.

1936 – Flood Control Act

- Authorized Federal policy on flood control and officially recognized the Corps as the major flood control agency

1943

- The Pentagon is completed just 15 months after groundbreaking
- Pentagon is the world's largest office building by floor area, 6.5 million square feet
- 23,000 military and civilian employees
- 17.5 miles of corridors


The Three Sisters
RIVER
Stevens
Sch
WASHINGTON CIRCLE
GEORGE WASHINGTON UNIVERSITY
VIRGINIA AVE
FORT BENNETT
Rosslyn
Wilson Sch
Colonial Village
Little River
Theodore Roosevelt Island
NAVAL HOSPITAL
26TH
COURT HOUSE
Radnor Heights
LEE BLVD
LINCOLN MEMORIAL
MEMORIAL BRIDGE
POTOMAC
TIDAL
ARLINGTON
PENNSYLVANIA
Columbia Island
MT VERNON MEM HY
FORT MYER
LEE MANSION
ARLINGTON NATIONAL CEMETERY
RIDGE RD
TOMB OF UNKNOWN SOLDIER
PARKING
HIGHWAY BRIDGE
Lagoon
ARLINGTON FORT MCPHERSON NATIONAL CEMETERY
PENTAGON BUILDING
PARKING
TURNPIKE
Arlington Village
Hoffman Boston Sch
Hume Sch
FORT RICHARDSON
HIGHWAY

1986

- Water Resources Development Act of 1986 (WRDA 86)
- Major changes in financing by requiring non-federal contributions toward Federal water resource projects

2000

- Comprehensive Everglades Restoration Plan
- Water Resources Development Act (WRDA) of 2000
- CRREL has provided Remote Sensing Support for this effort

CRREL Projects

- Formerly Used Defense Sites
  - Websites available to the public:
  - https://environment.usace.army.mil/what_we_do/fuds/
  - https://rsgis.crrel.usace.army.mil/publicfuds/

CRREL Projects

- National Inventory of Dams
- National Levee Database
- Levee Inspection System and Levee Inspection Tools
- Missouri River Restoration
- Mussels Database

CRREL Projects

- Icejam Database
  - Websites available to the public:
  - https://rsgis.crrel.usace.army.mil/icejam/
  - https://rsgis.crrel.usace.army.mil/apex/f?p=273:3:368519220113279 4
- Icejam expertise & decision making support

CRREL Projects

- Physical modeling of ice for locks, dams and harbors (CRREL's Ice Engineering Facility

- Frost Effects Research Facility (FERF) for pavement & dirt road research of freeze-thaw processes (heaving, pot holes, etc

CRREL Projects

- Training
  - We train members of the Corps in Geographic Information Systems and Remote Sensing
  - The Corps teaches courses through a training center based in Huntsville, Alabama, the USACE Learning Center, but courses are taught by subject matter experts (SME's) throughout the Corps

CRREL Projects

- CorpsMap, the USACE Operations Center enterprise web-based mapping application
- CorpsMap is web based but is behind the Corps Firewall and not accessible to the public. The FUDS GIS and the IceJam Database maps use the same technology and are similar in look and feel to CorpsMap (see previous slides for links)

Corporate System Support

- CorpsMap
- Formerly Used Defense Sites (FUDS)
- Engineers Link Interactive (EngLink)
- Corps Water Management System (CWMS)
- Inland Electronic Navigation Charts (IENC)
- Operations and Maintenance Business Information Link (OMBIL) Regulatory Module (ORM2)
- Defense Installation Spatial Data Infrastructure (DISDI)
- National Levee Database (NLD)
- Levee Inspection System (LIS)
- National Inventory of Dams (NID)
- Watershed Investment Decision Tool (WIDT)
- Reservoir Inundation Calculator

- CRREL Civil Works Technical Areas
  - Hydrology and Hydraulics
  - Water Resources Geospatial Applications
  - Cold Regions Infrastructure

- ERDC Civil Business Areas
  - Civil Works
  - Environmental Quality & Infrastructure
  - Geospatial Research and Engineering

Examples of Current CRREL Civil Works Applications

- The following slides contain a series of applications that CRREL and RS/GIS currently produce for the Corps Civil Works programs

Examples of Current Corps Applications

CorpsMap

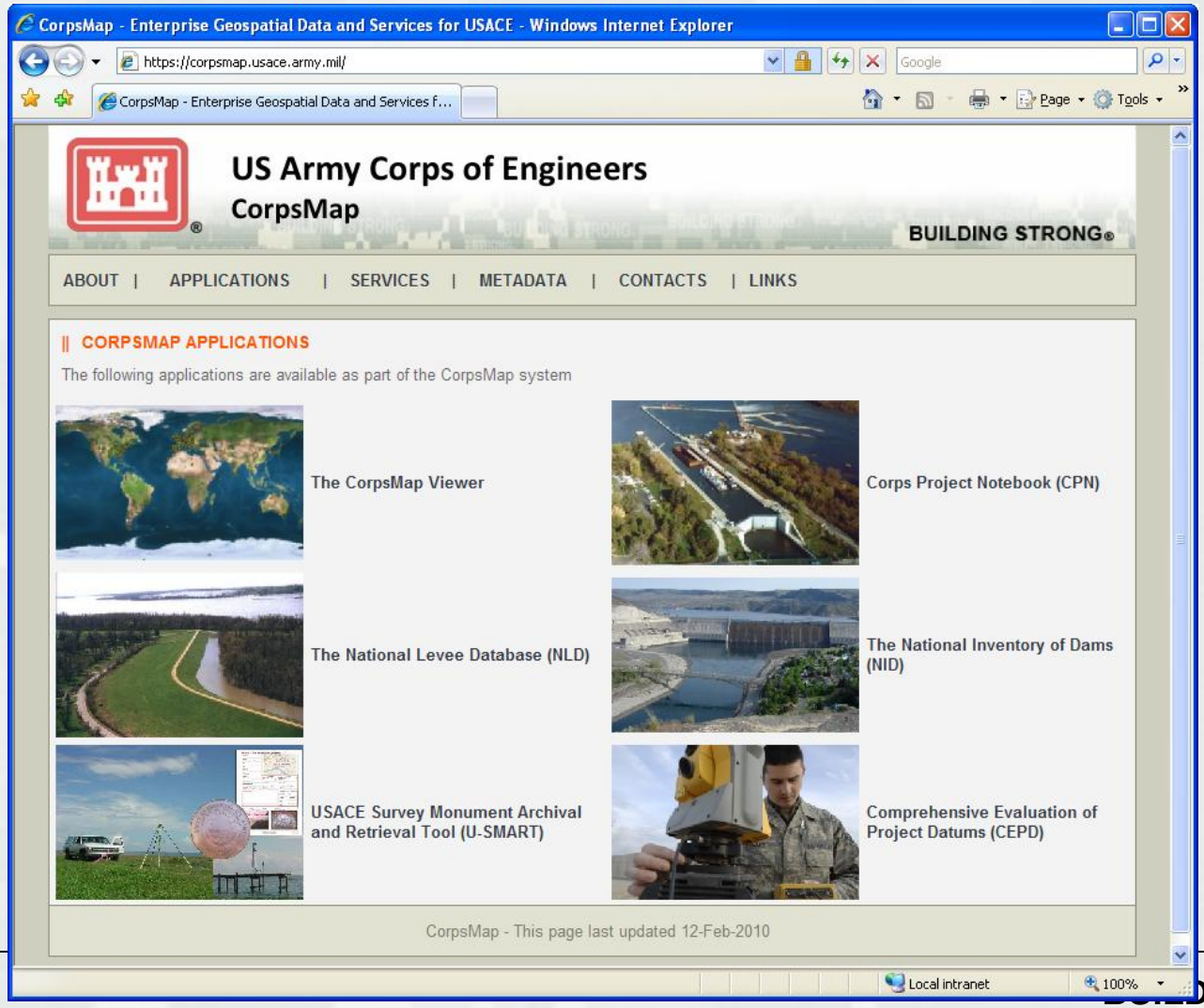
Overview

- Nationwide enterprise GIS (e-GIS) implementation for the U.S. Army Corps of Engineers via an interactive map that provides visual access to the CorpsMap datasets
- Consists of an operational geospatial database, an open interface, and a web portal
- Supports data analysis and visualization using a Web browser, Google Earth, ESRI ArcGIS, C/JMTK, and other off-the-shelf software
- Provides access to USACE corporate databases using web mapping capabilities
- Supports map generation and searches by state, county, and congressional district, as well as report generation and links to databases accessible via CorpsMap

Examples of Current Corps Applications

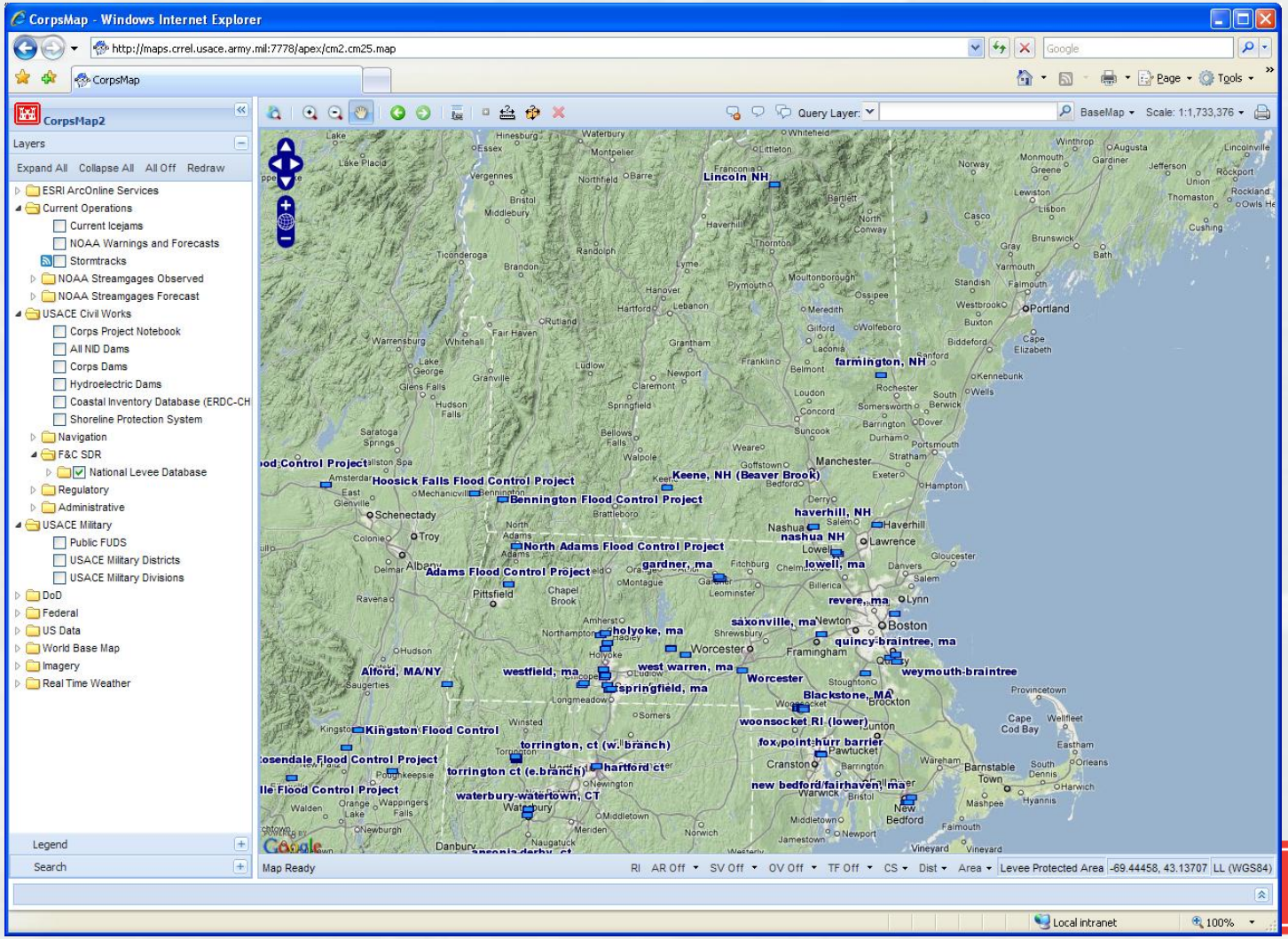
CorpsMap

Web-Accessible Interface



Examples of Current Corps Applications

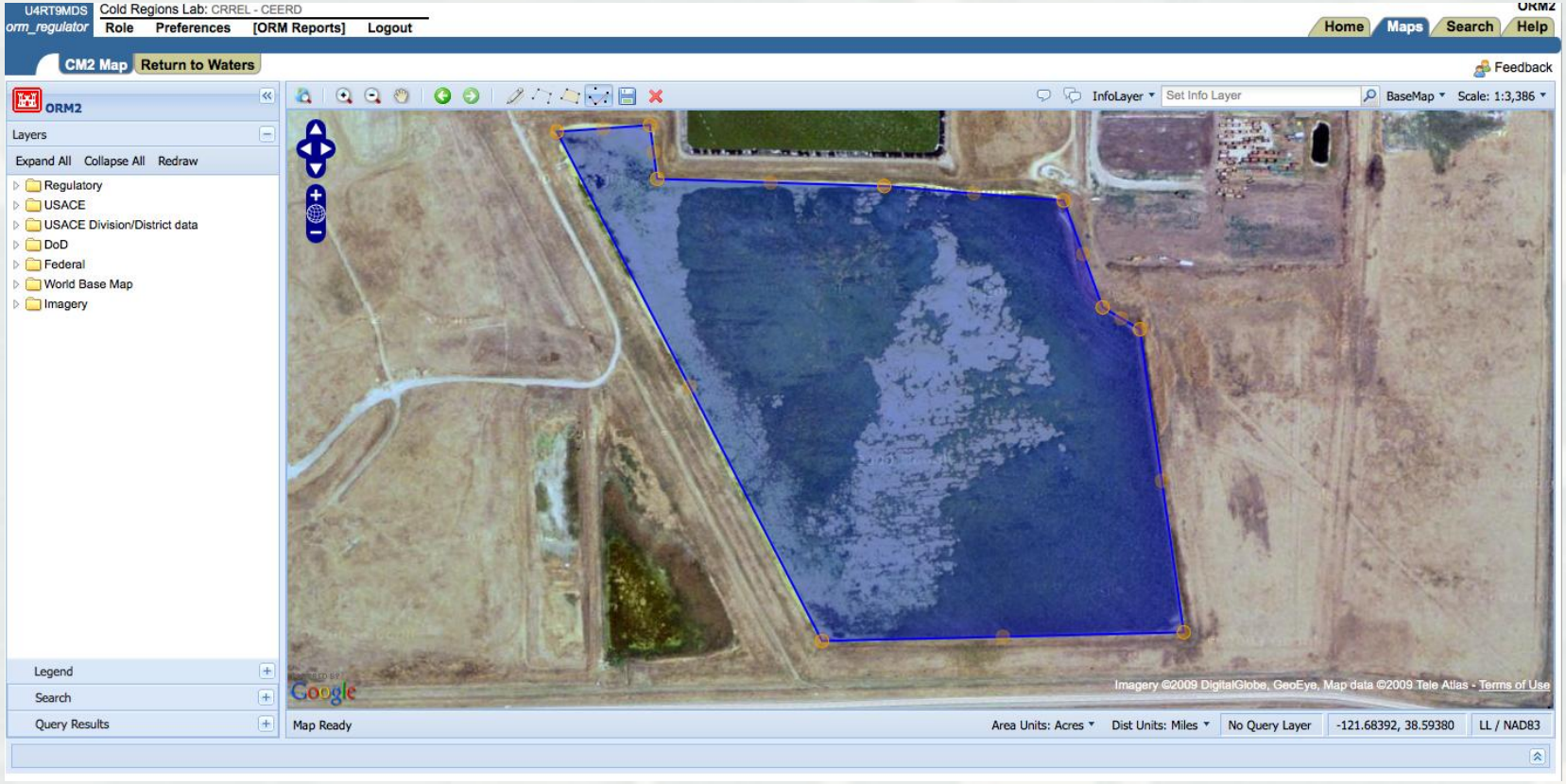
CorpsMap



Examples of Current Corps Applications

CorpsMap

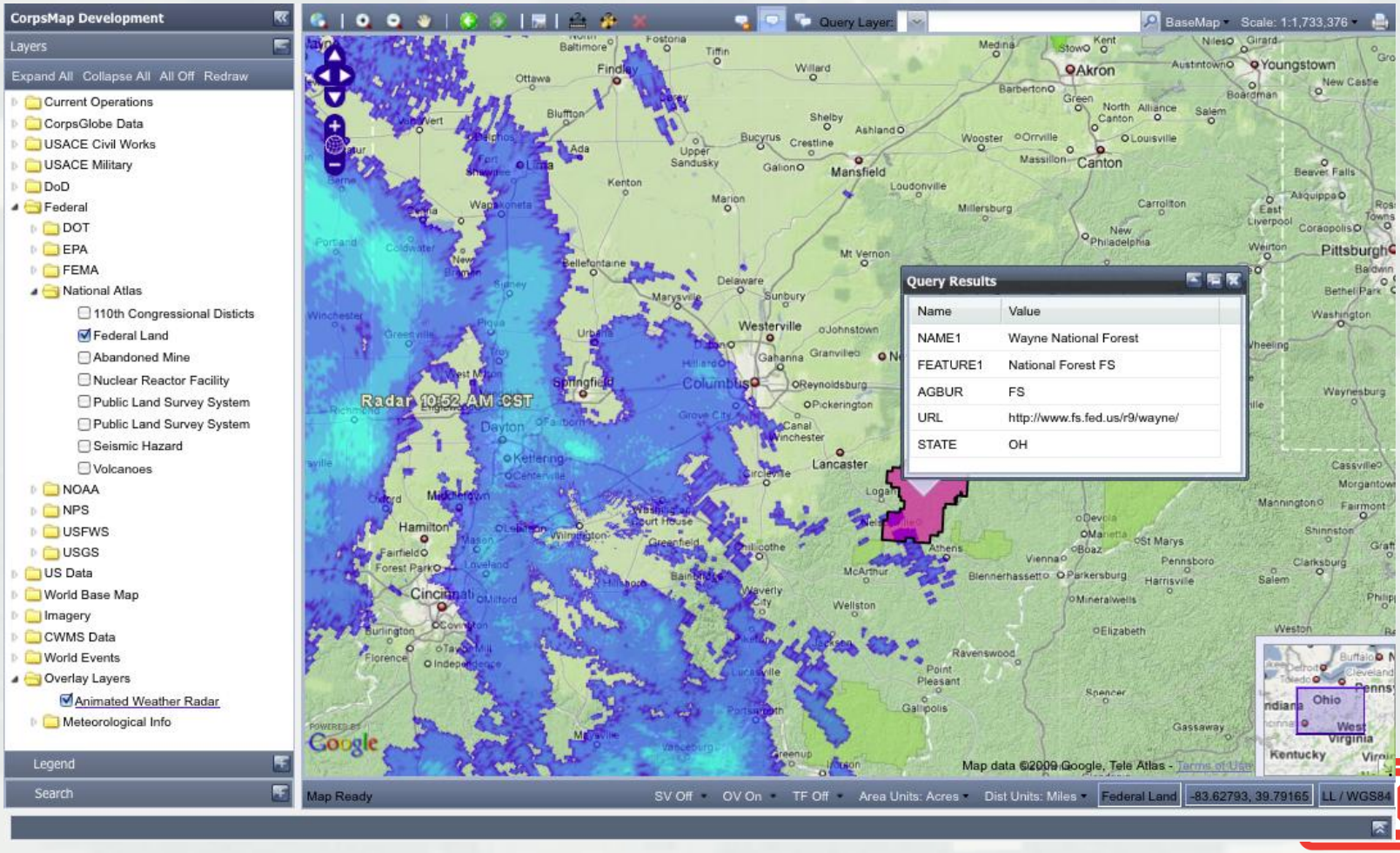
On-Screen Digitizing



Examples of Current Corps Applications

CorpsMap

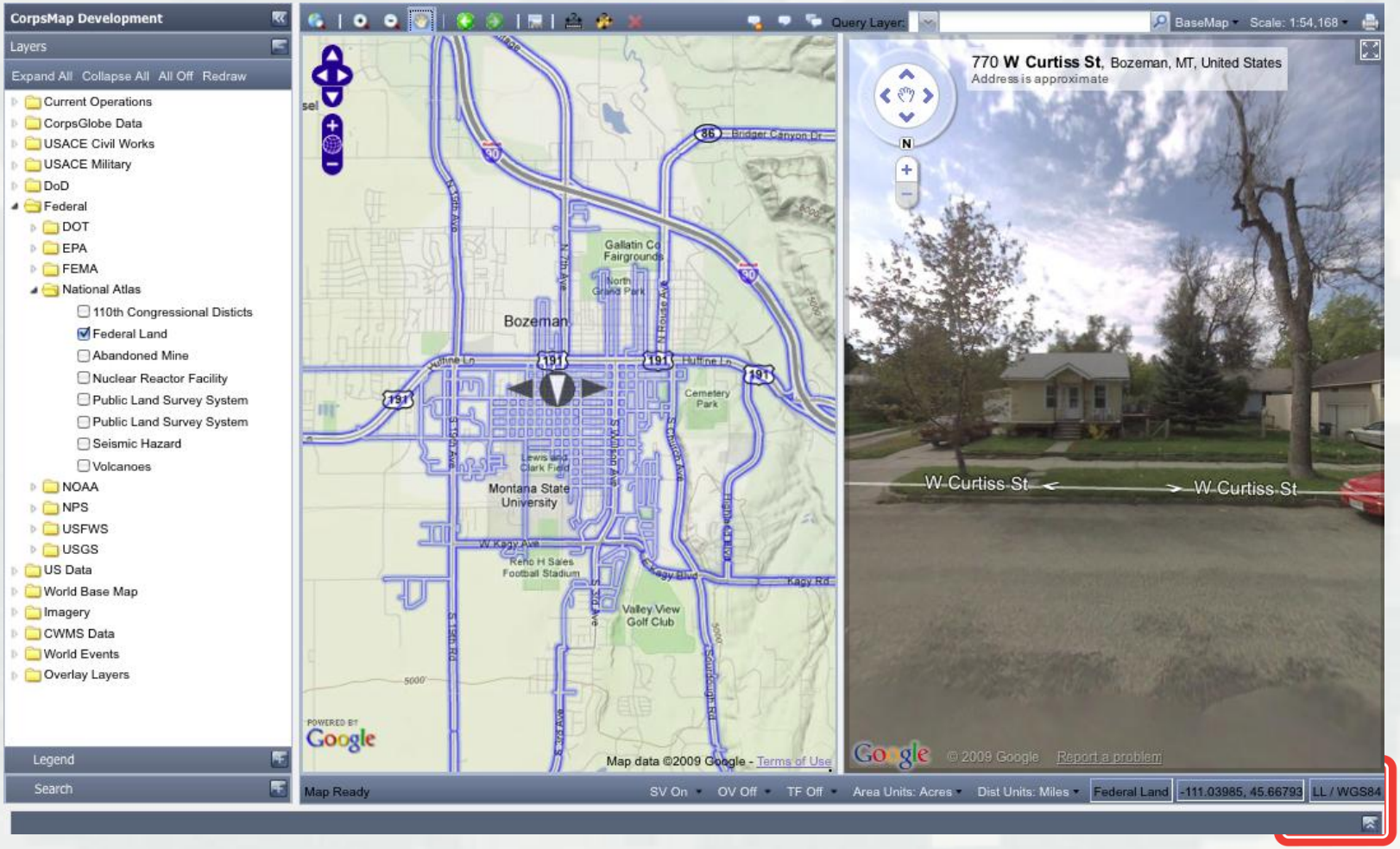
Query Results, Animated Radar



Examples of Current Corps Applications

CorpsMap

Street View



Examples of Current Corps Applications

Formerly Used Defense Sites (FUDS) Program

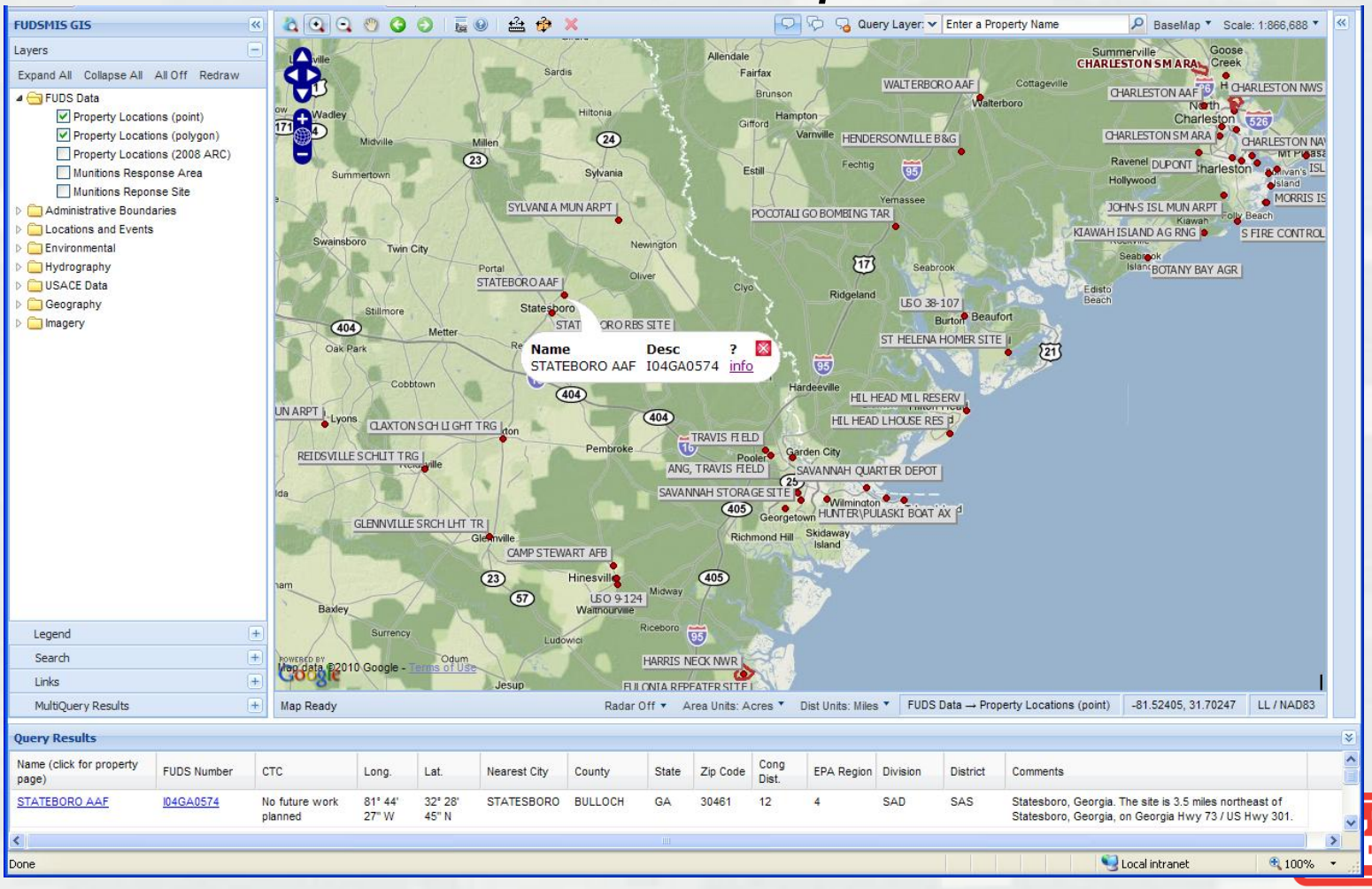
Overview

- FUDS Management Information System (FUDSMIS) GIS: for internal use by FUDS Program and Project Managers to track and report FUDS project and phase data required for planning, programming, budgeting, and execution
  - The GIS is fully integrated with FUDSMIS and provides spatial tools and functions necessary for decision support
- FUDS Public GIS: Publicly accessible web-based GIS published to facilitate exchange of information between Divisions and Districts and regulatory agencies, local and tribal governments, and the general public
  - Accessed through FUDS program link on the HQ USACE Environmental website http://hq.environmental.usace.army.mil/programs/fuds/fuds.html

Examples of Current Corps Applications

FUDSMIS GIS

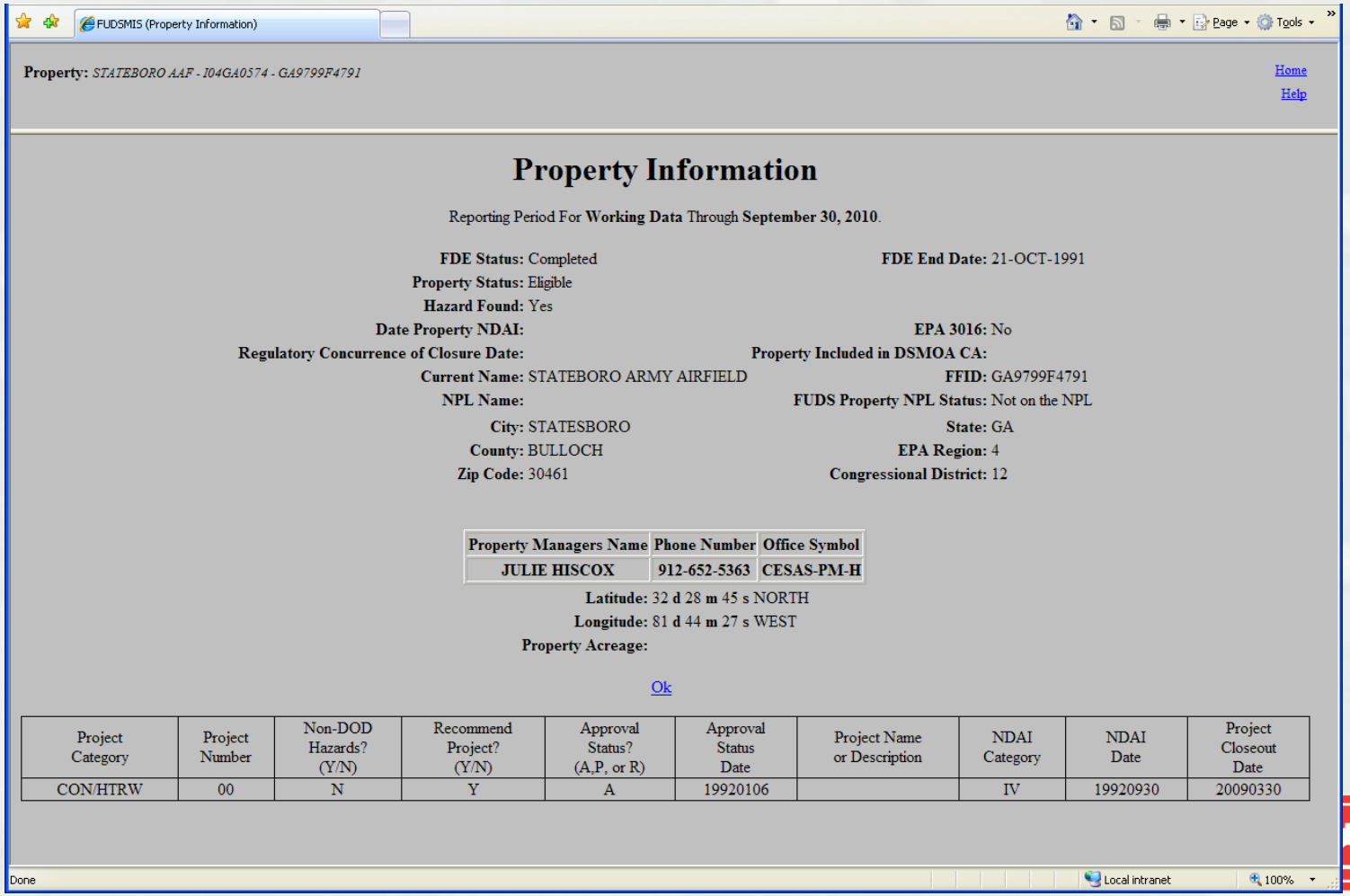
Web-Accessible Interface



Examples of Current Corps Applications

FUDSMIS GIS

Link to FUDSMIS



FUDSMIS (Property Information)

Property: *STATEBORO AAF - I04GA0574 - GA9799F4791*

Home
Help

Property Information

Reporting Period For **Working Data** Through **September 30, 2010**.

FDE Status: Completed
FDE End Date: 21-OCT-1991
Property Status: Eligible
Hazard Found: Yes
Date Property NDAI:
EPA 3016: No
Regulatory Concurrence of Closure Date:
Property Included in DSMOA CA:
Current Name: STATEBORO ARMY AIRFIELD
FFID: GA9799F4791
NPL Name:
FUDS Property NPL Status: Not on the NPL
City: STATESBORO
State: GA
County: BULLOCH
EPA Region: 4
Zip Code: 30461
Congressional District: 12

Property Managers Name	Phone Number	Office Symbol
JULIE HISCOX	912-652-5363	CESAS-PM-H

Latitude: 32 d 28 m 45 s NORTH
Longitude: 81 d 44 m 27 s WEST
Property Acreage:

Ok

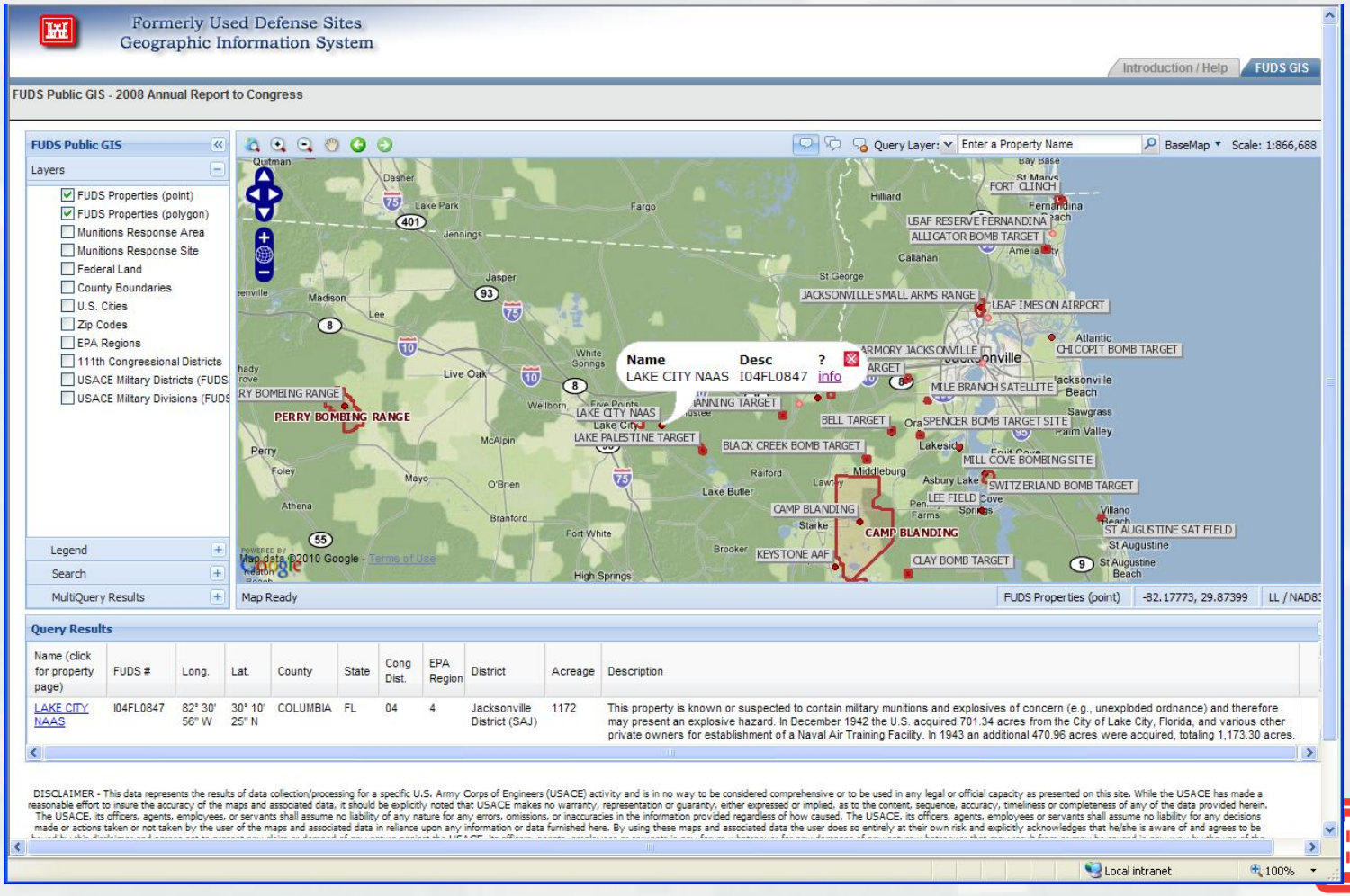
Project Category	Project Number	Non-DOD Hazards? (Y/N)	Recommend Project? (Y/N)	Approval Status? (A,P, or R)	Approval Status Date	Project Name or Description	NDAI Category	NDAI Date	Project Closeout Date
CON/HTRW	00	N	Y	A	19920106		IV	19920930	20090330

Done
Local intranet
100%

Examples of Current Corps Applications

FUDS Public

Web-Accessible Interface



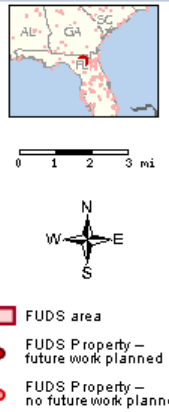
Examples of Current Corps Applications

FUDSMIS & FUDS Public

Property Information Page

Property Name : I04FL0847 - LAKE CITY NAAS

Latitude:	30° 10' 25" N
Longitude:	82° 30' 56" W
City:	LAKE CITY
County:	COLUMBIA
State:	FL
Congressional District:	04
EPA Region:	4
Property Acreage:	1172
USACE Office:	Jacksonville District
Current Ownership Type:	CITY; STATE
Cost to Complete (thousands):	$4865.67



Property Description:

This property is known or suspected to contain military munitions and explosives of concern (e.g., unexploded ordnance) and therefore may present an explosive hazard. In December 1942 the U.S. acquired 701.34 acres from the City of Lake City, Florida, and various other private owners for establishment of a Naval Air Training Facility. In 1943 an additional 470.96 acres were acquired, totaling 1,173.30 acres. The site was located 2.5 miles east of Lake City, off U.S. Highway No. 90 in Columbia County, Florida. In October 1946 the Navy declared all but 2.76 acres surplus (the 2.76 acres were set aside for use by a Naval Reserve Volunteer Electronic Warfare Company). The land was conveyed to the City of Lake City and the City of Lake City currently utilizes their portion of the former site for the Lake City Municipal Airport and Industrial Park. In 1949, 85.6 acres were conveyed to the Columbia Forestry School, Lake City, Florida, which were utilized for educational purposes. The Columbia Forestry School, in turn, conveyed their portion to the Trustees of the Internal Improvement Fund of Florida and the 2.76 acres previously reacquired were excessed to the State of Florida and are currently being utilized for the Lake City Community College.

Property History:

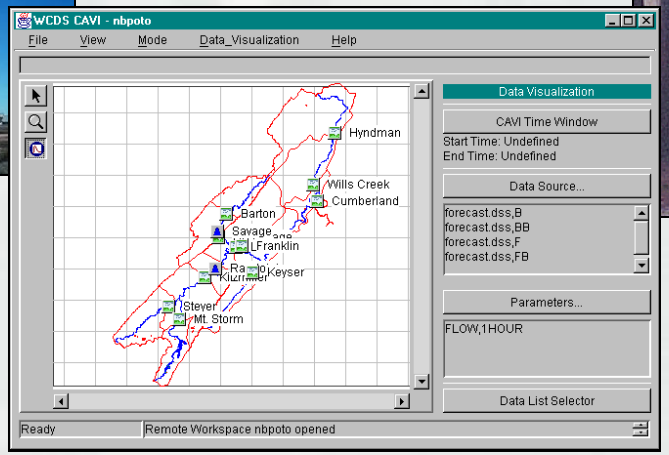
This property is known or suspected to contain military munitions and explosives of concern (e.g., unexploded ordnance) and therefore may present an explosive hazard. Between 1942 and 1946, the U.S. Navy developed the site and named it the Naval Air Station, Lake City, Florida. The Navy constructed approximately 70 buildings, installed runways, taxiways, aprons, and other miscellaneous improvements to complete the air training facility. The Navy utilized the installation as an operational training base. The site remained active until 1948 when its mission was completed and the site was no longer required. The Navy retained ownership of 2.76 acres until 1948 which it utilized as a Naval Reserve Volunteer Electronic Warfare Company.

Examples of Current Corps Applications

Corps Water Management System (CWMS)

Overview

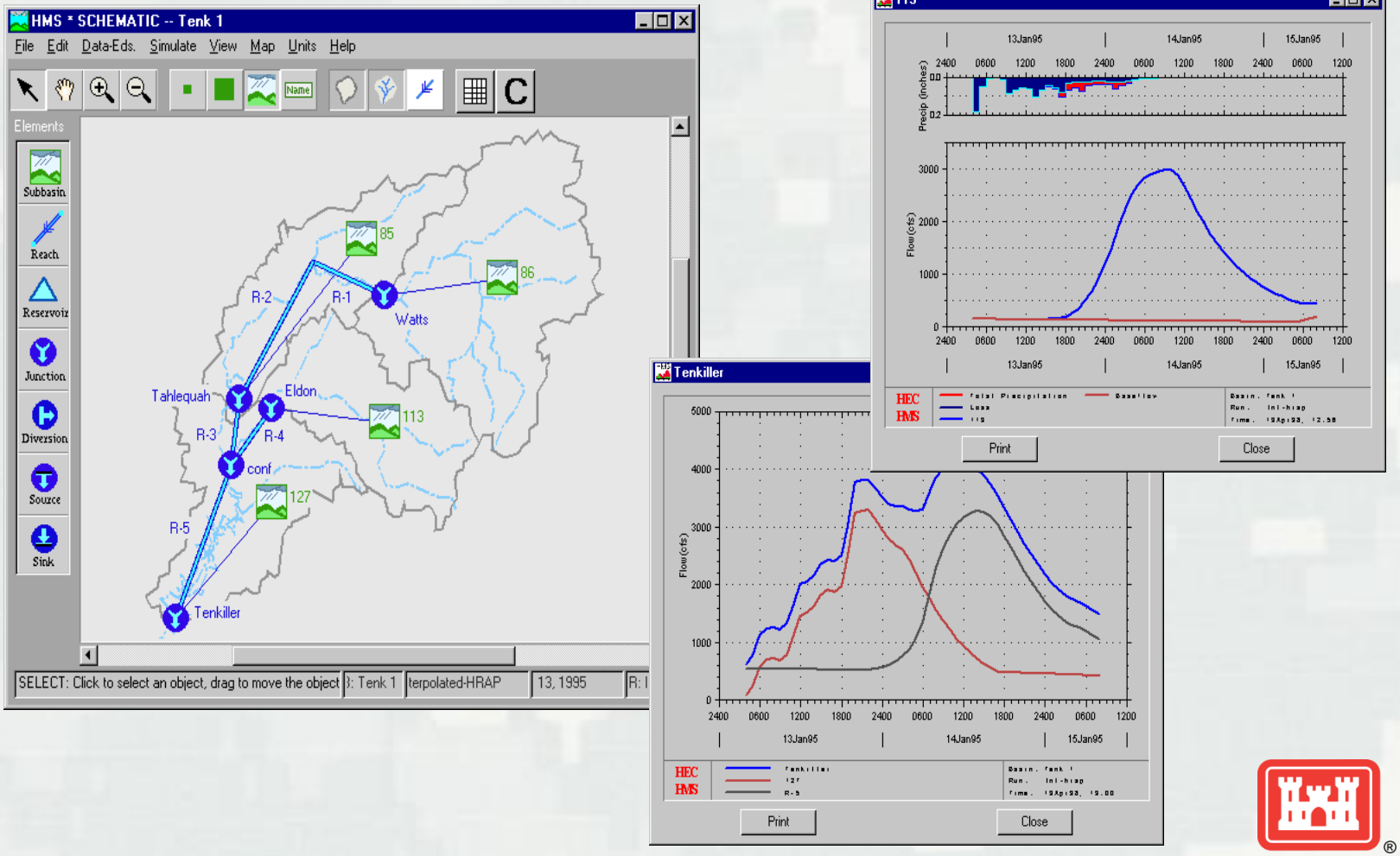
- Improved Real-Time Decision Support for Water Management
- 700+ Multipurpose Reservoirs and Flow Control Structures, Thousands of Miles of Levees
- Expanded Corporate Web-Based Information
- Standardized Corporate Hardware/Software Class IV AIS



Examples of Current Corps Applications

Corps Water Management System (CWMS)

Hydrologic Analysis



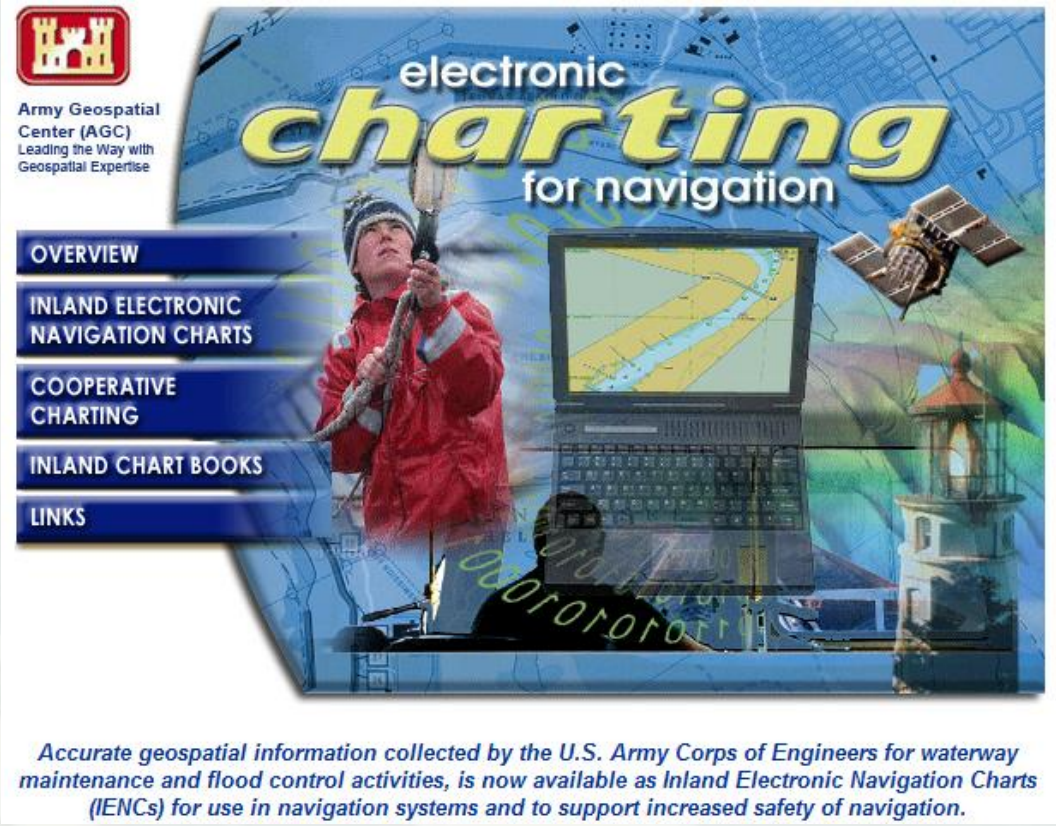
BUILDING STRONG®

Examples of Current Corps Applications

Inland Electronic Navigation Charts (IENC)

Overview

- Accurate geospatial information collected by the USACE for waterway maintenance and flood control activities
- Electronic charts for much of the 8,200 miles of rivers in the U.S. Inland River System
- Have very consistent features, scale, accuracy, and update frequency
- Charts available for download

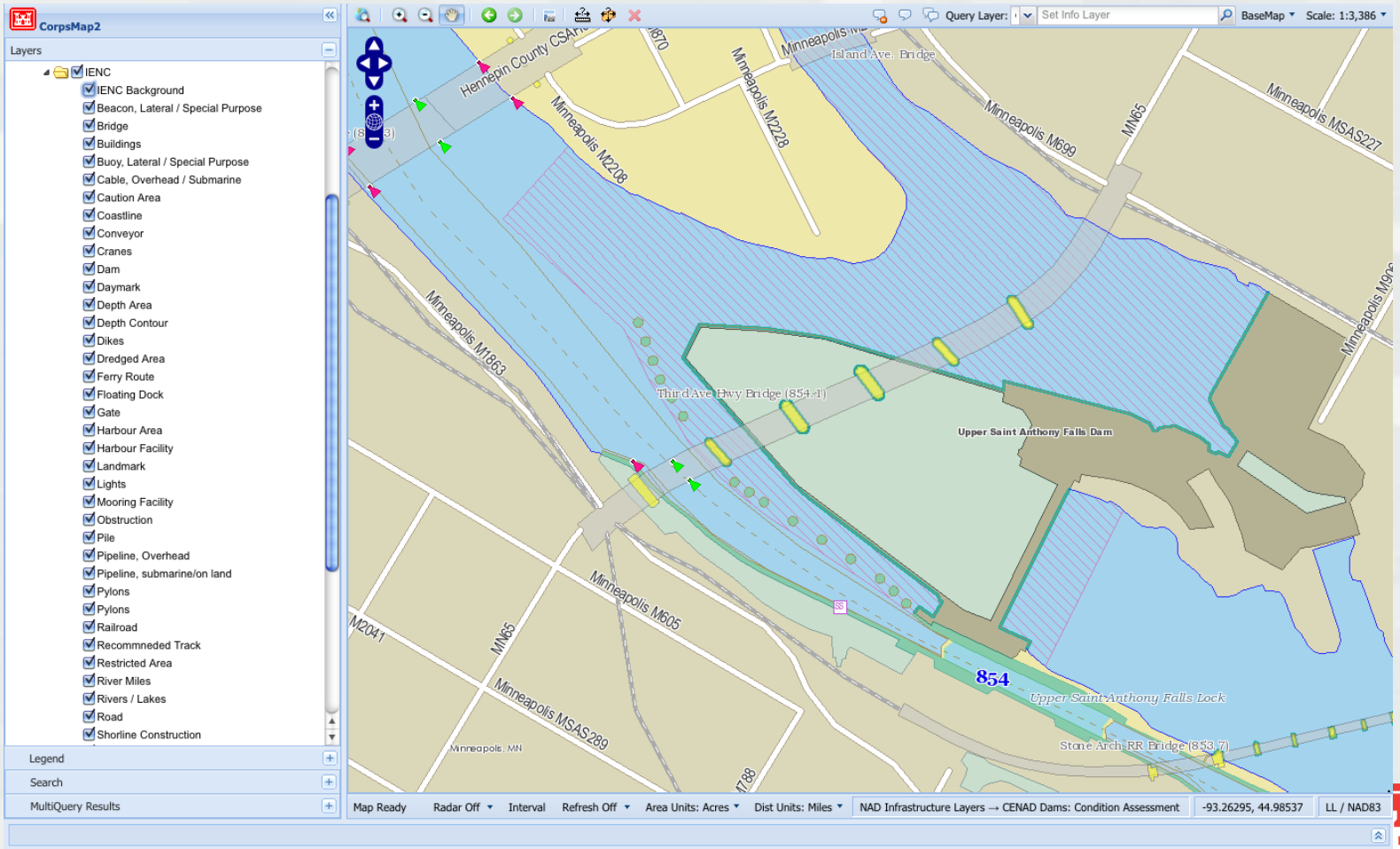


Accurate geospatial information collected by the U.S. Army Corps of Engineers for waterway maintenance and flood control activities, is now available as Inland Electronic Navigation Charts (IENCs) for use in navigation systems and to support increased safety of navigation.

Examples of Current Corps Applications

Inland Electronic Navigation Charts

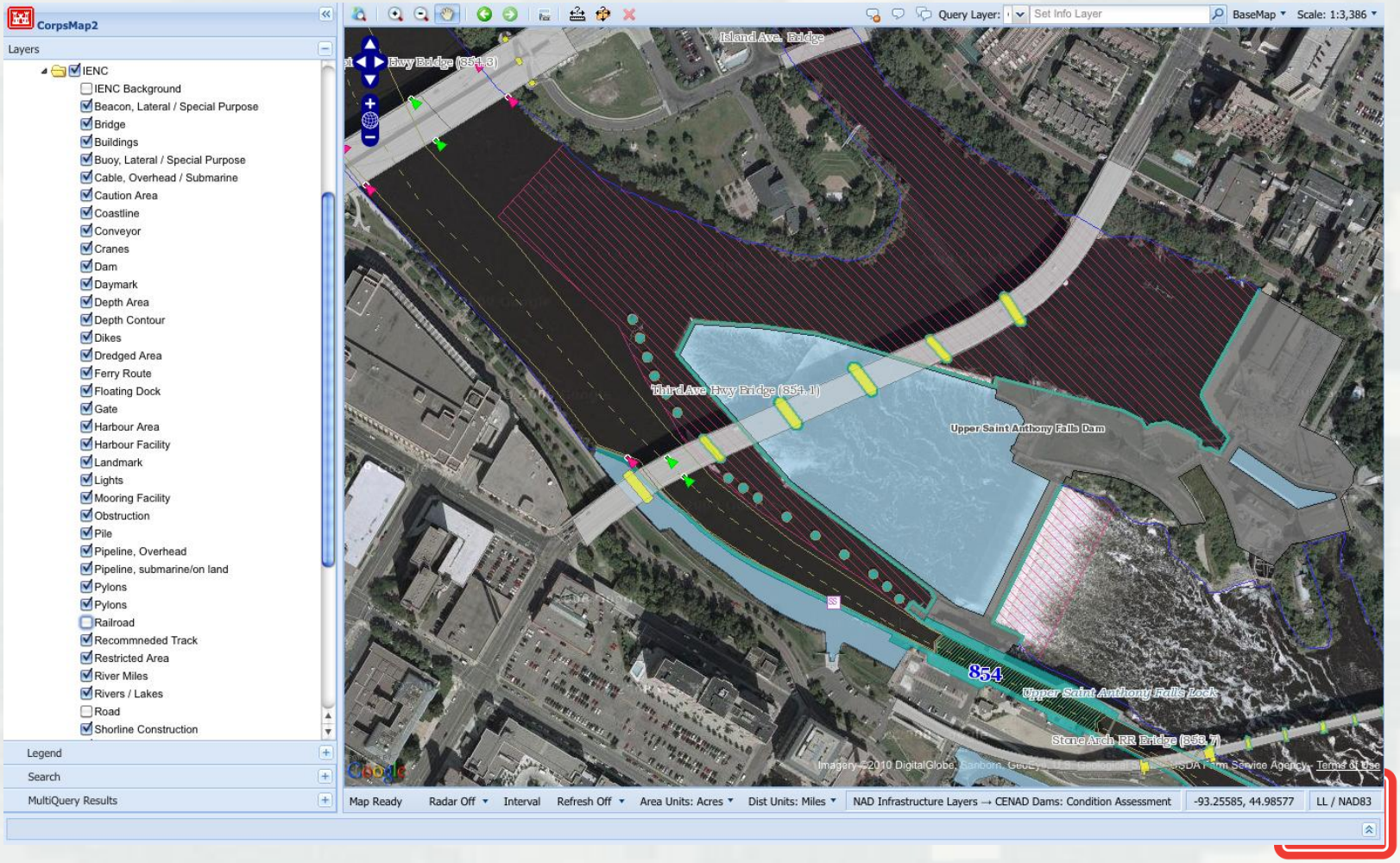
Data displayed in CorpsMap



Examples of Current Corps Applications

Inland Electronic Navigation Charts

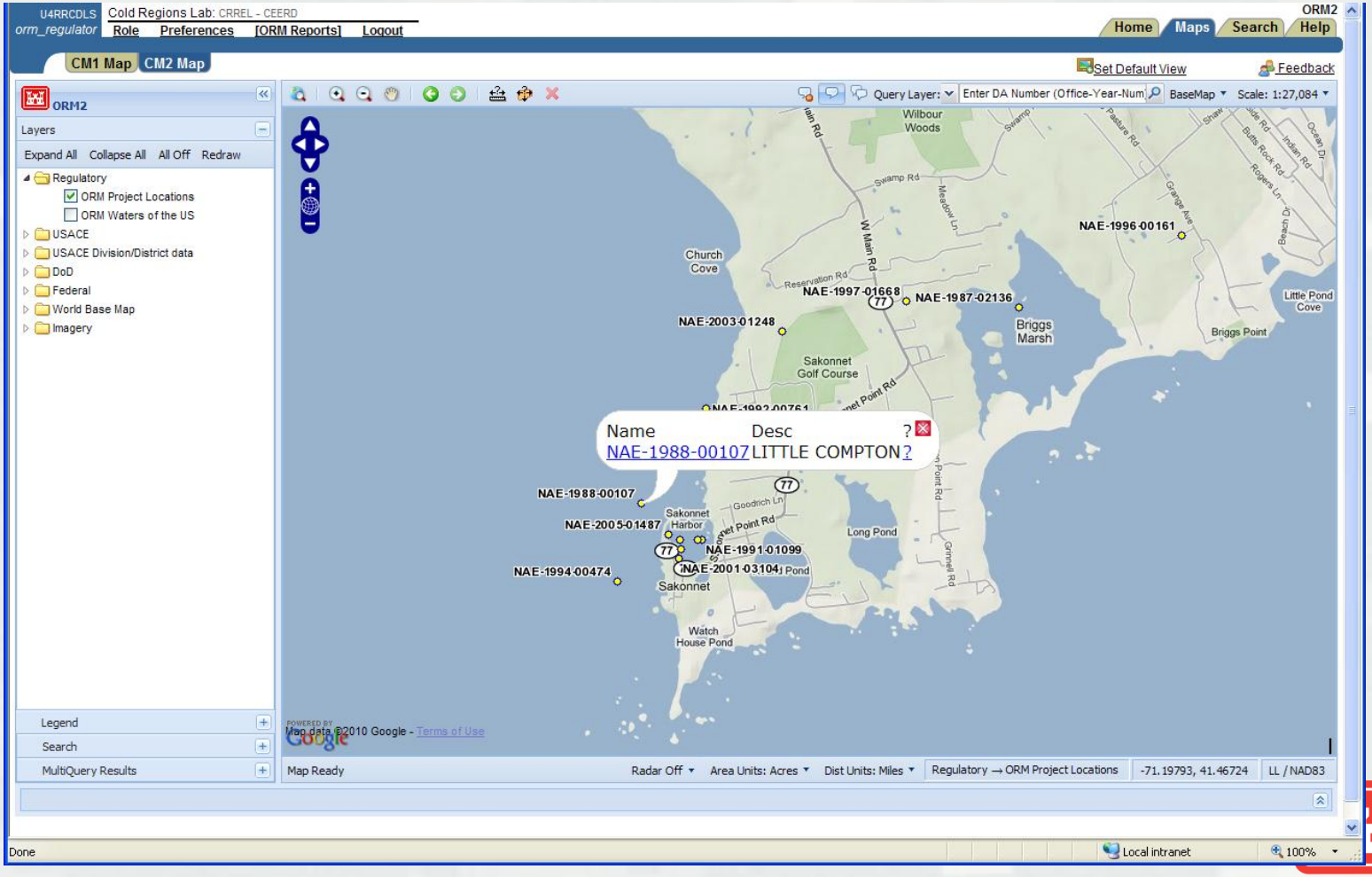
Data displayed in CorpsMap with Background Off



Examples of Current Corps Applications

OMBIL Regulatory Module (ORM2)

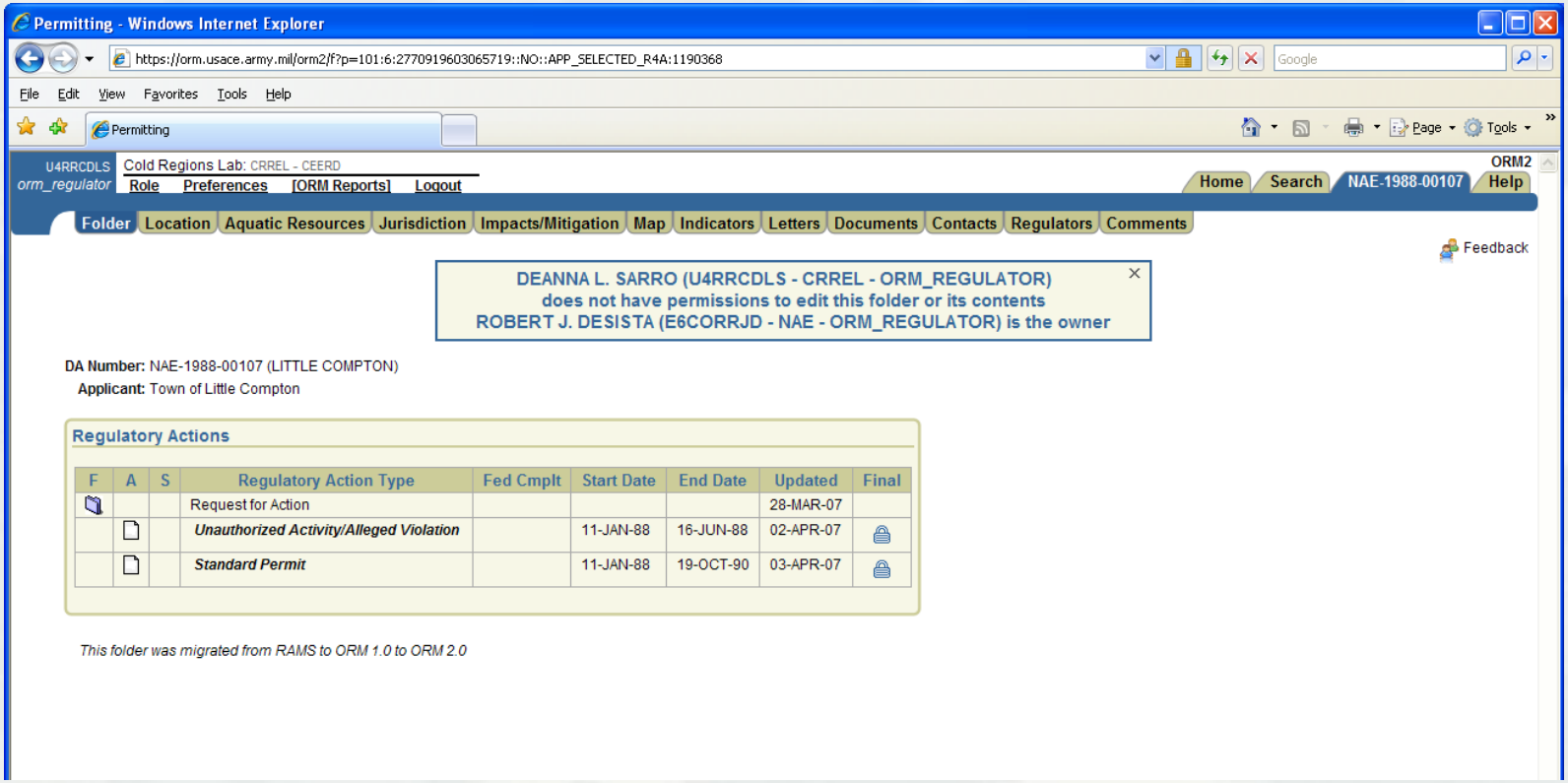
ORM2 CorpsMap Interface



Examples of Current Corps Applications

OMBIL Regulatory Module (ORM2)

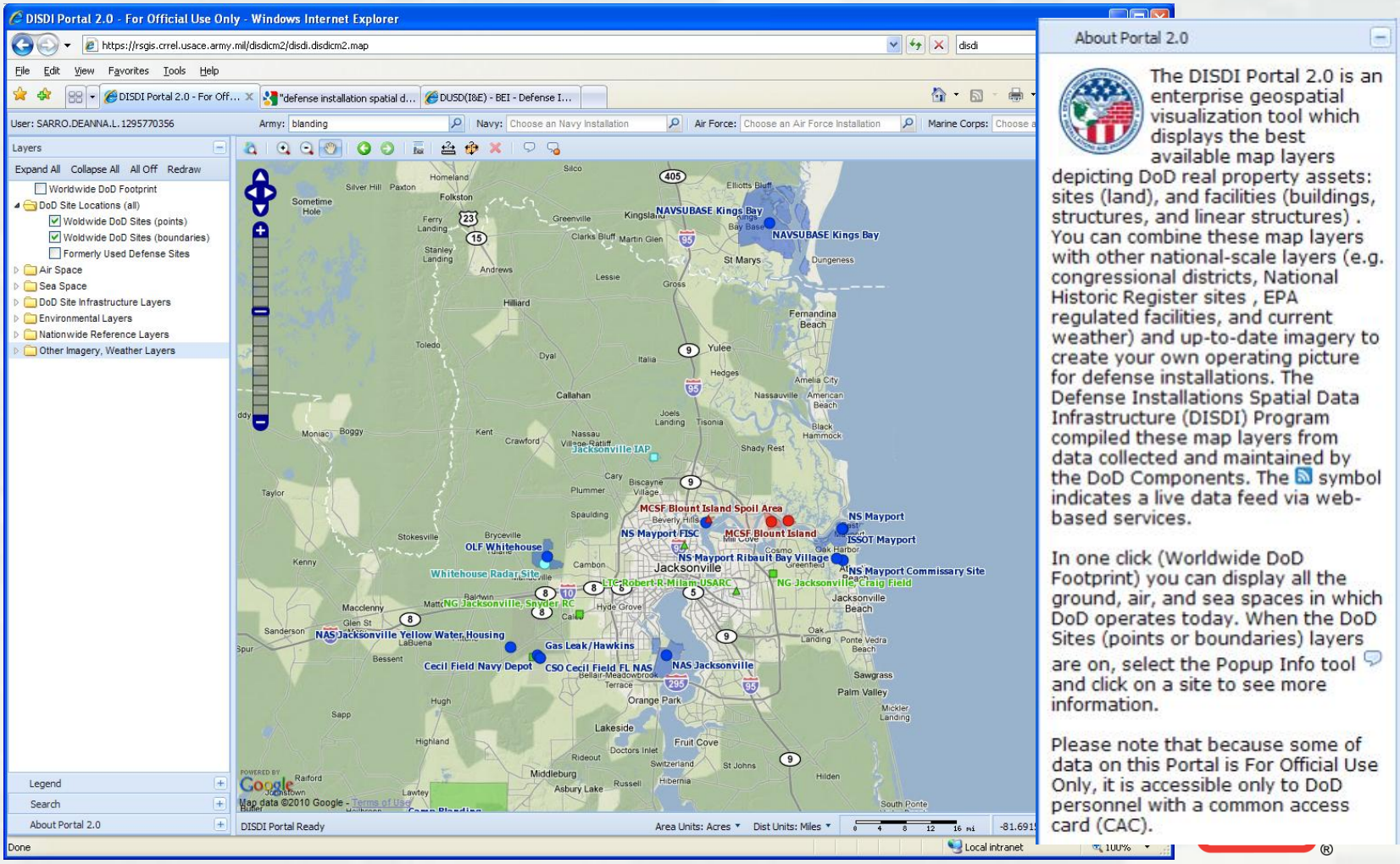
Link to Permit



Examples of Current Corps Applications

Defense Installation Spatial Data Infrastructure (DISDI)

DISDI Portal

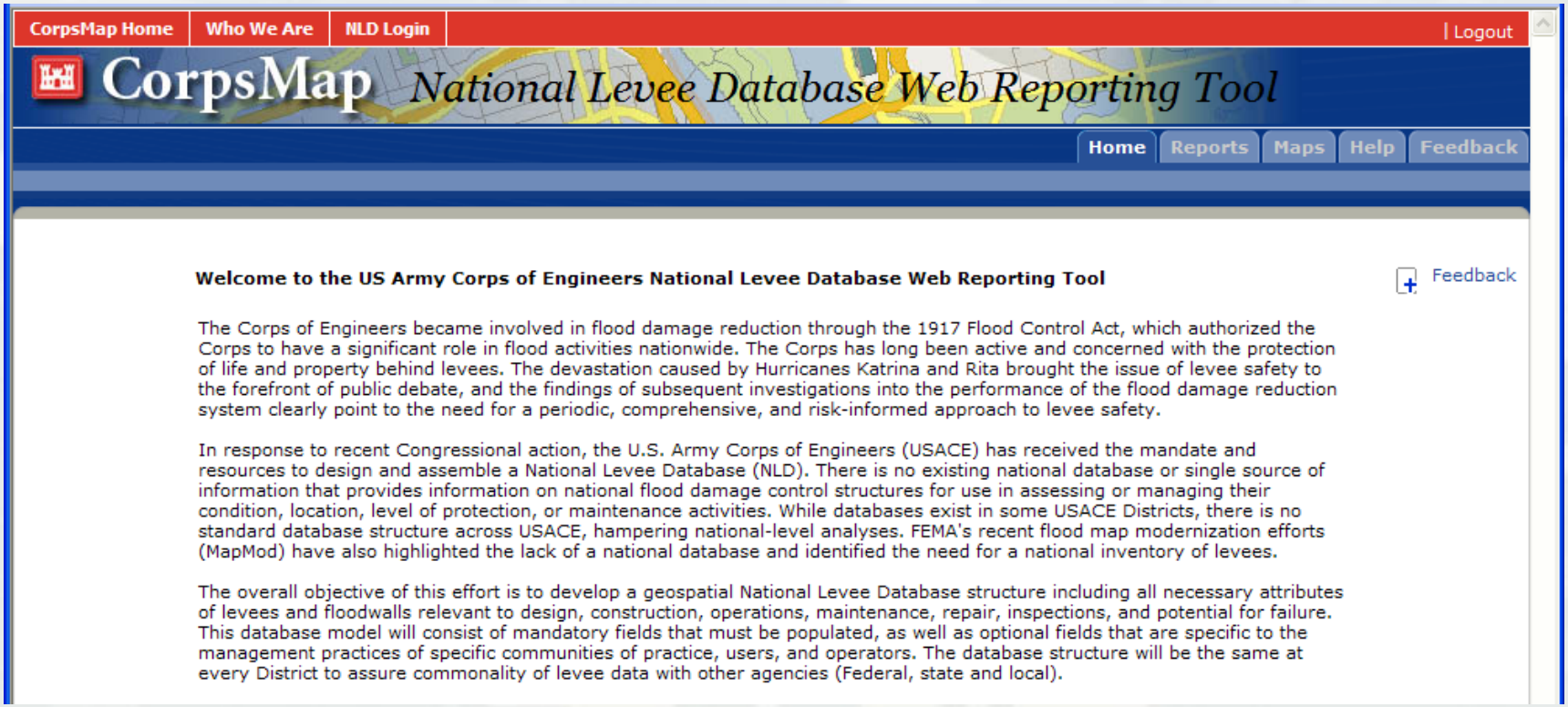


https://rsgis.crrel.usace.army.mil/disdicm2/disdi.disdicm2.map- need CAC card to access

Examples of Current Corps Applications

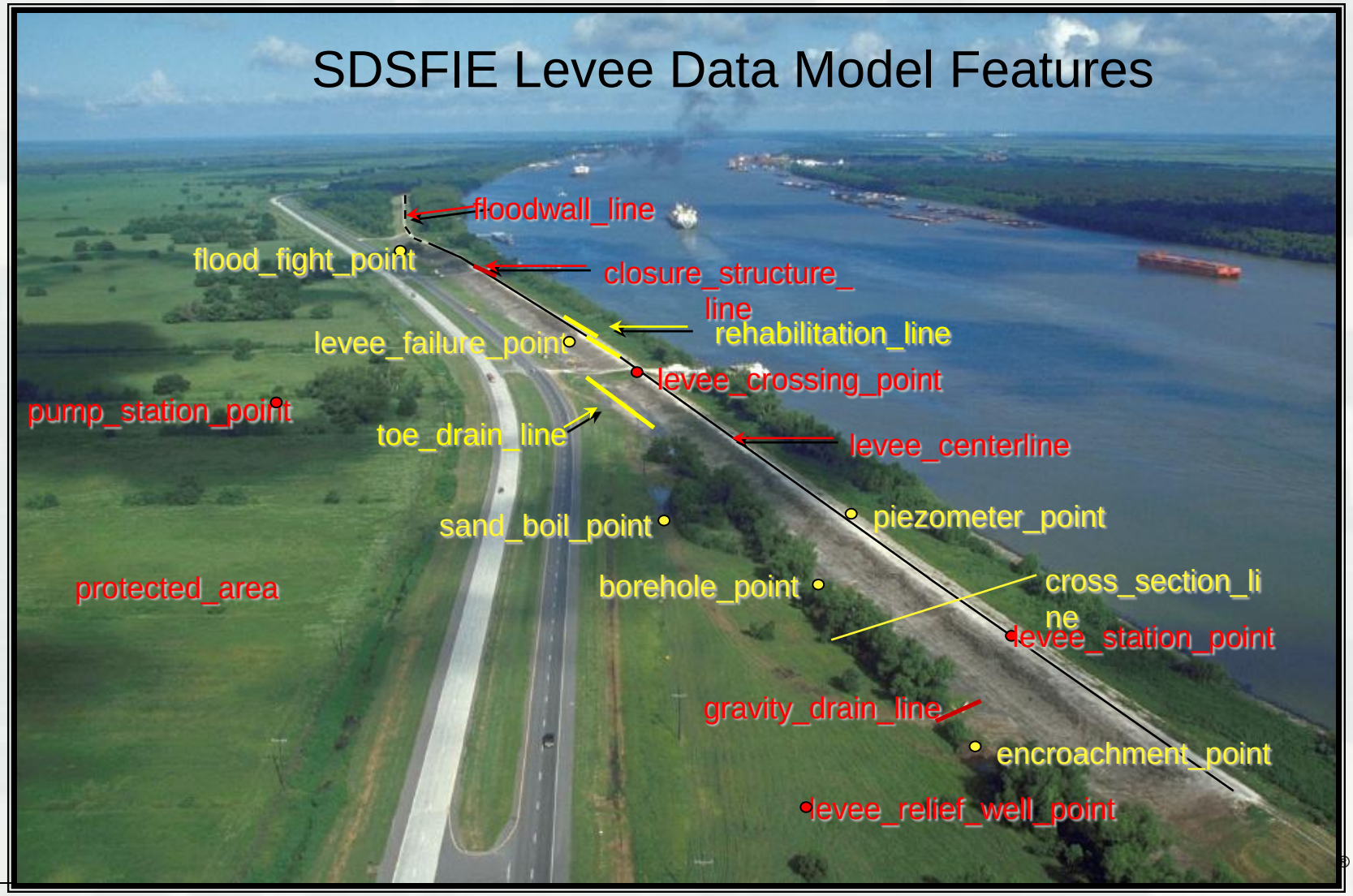
National Levee Database

Overview



Examples of Current Corps Applications

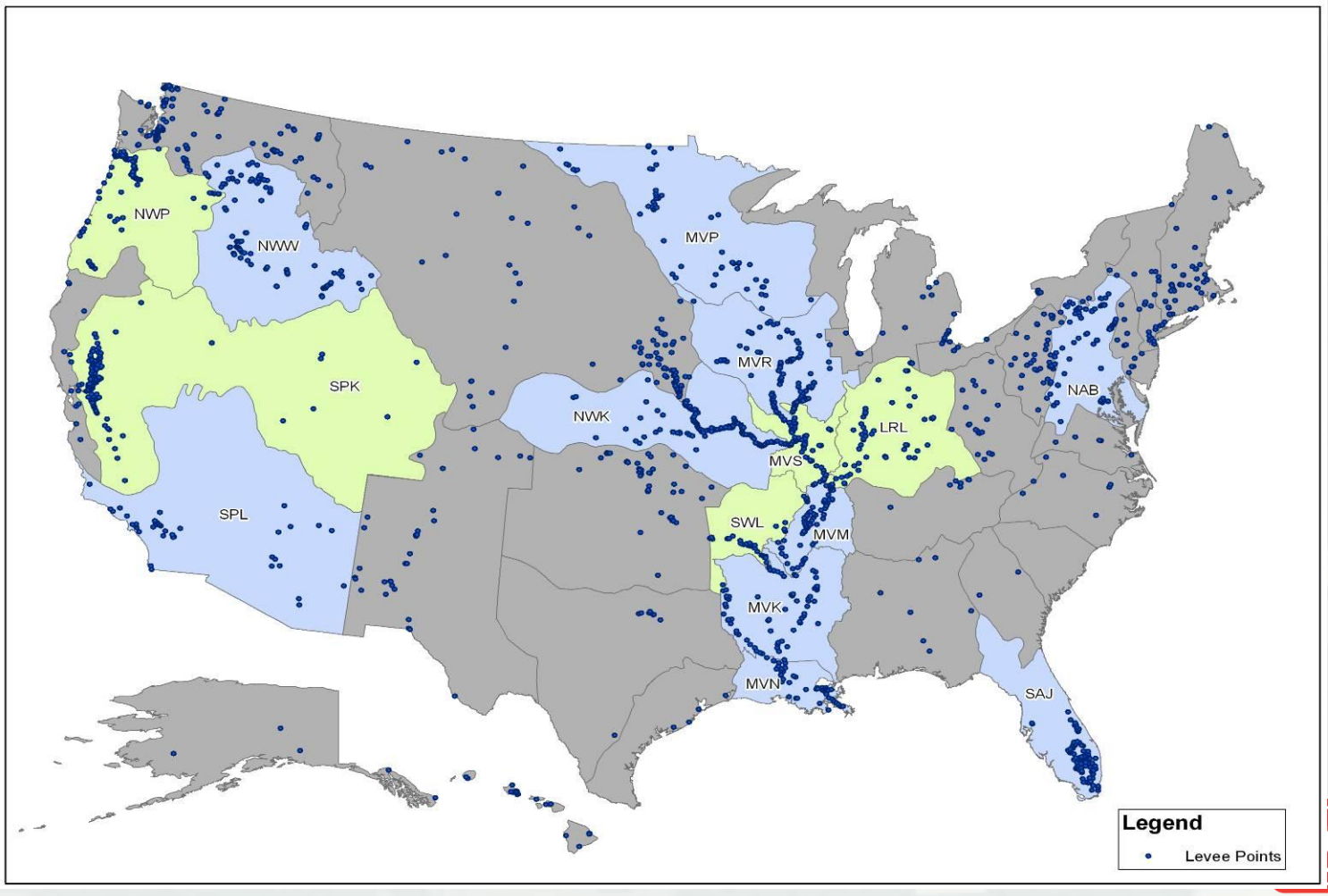
National Levee Database



Examples of Current Corps Applications

National Levee Database

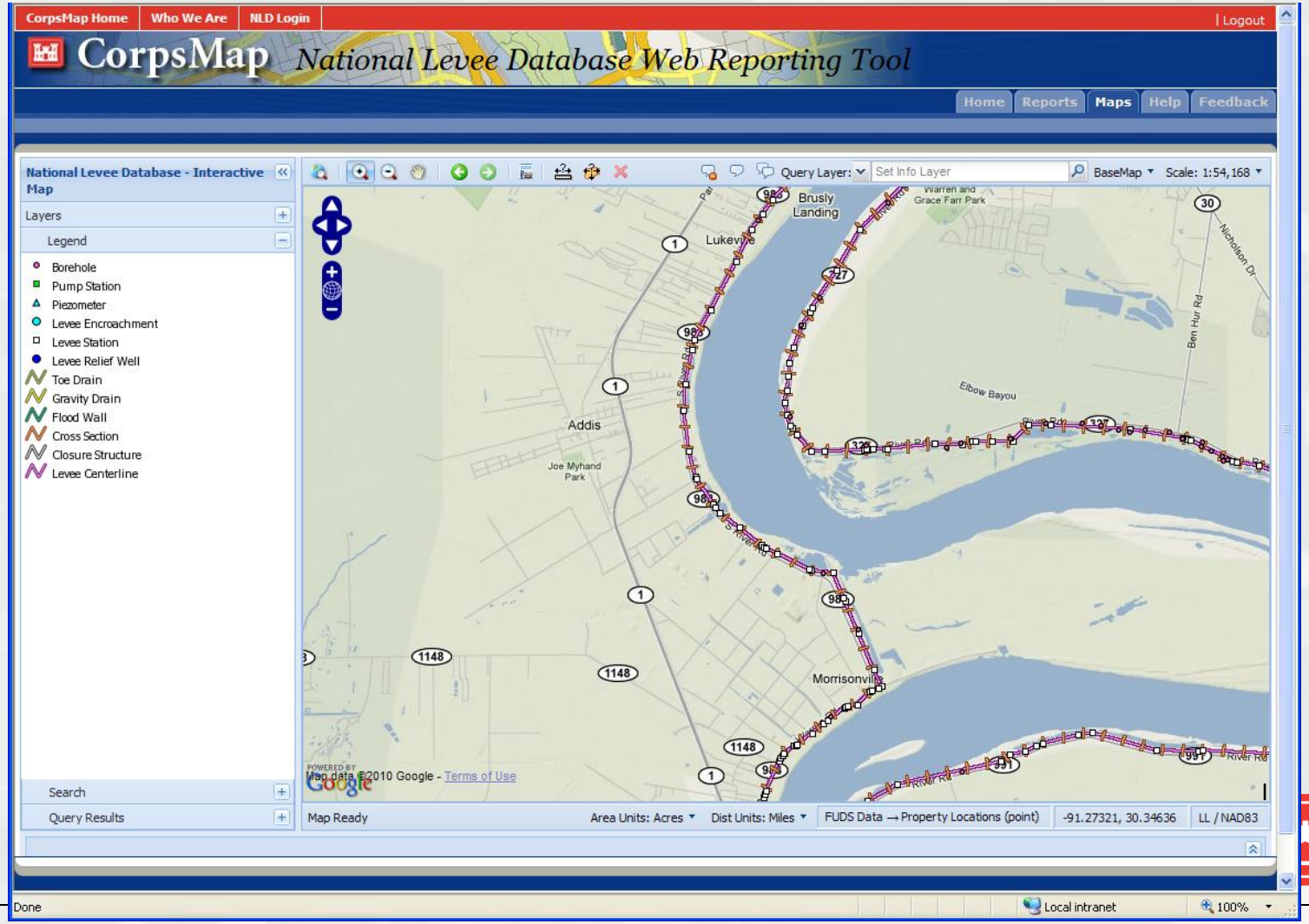
Levees



Examples of Current Corps Applications

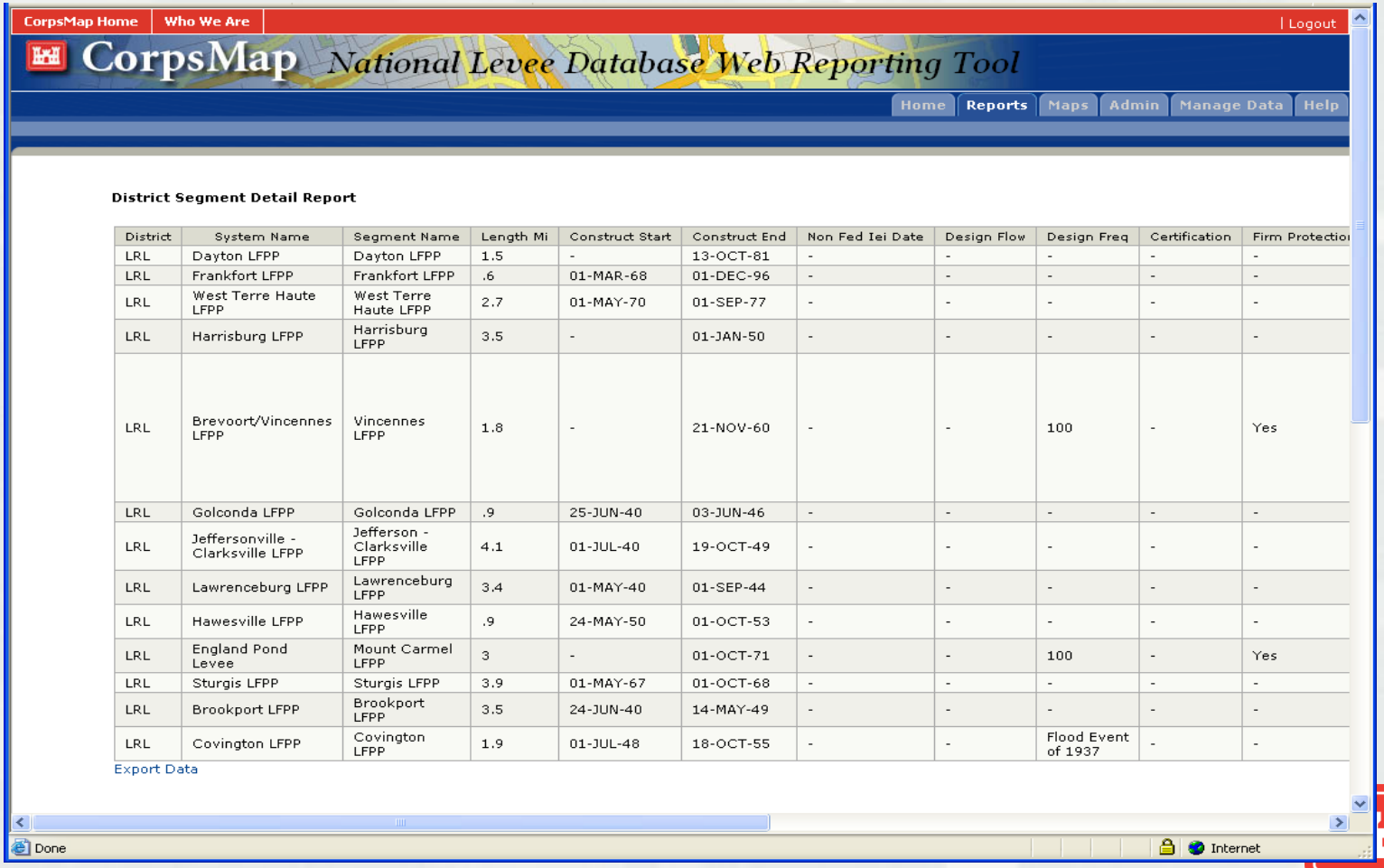
National Levee Database

GIS



Examples of Current Corps Applications

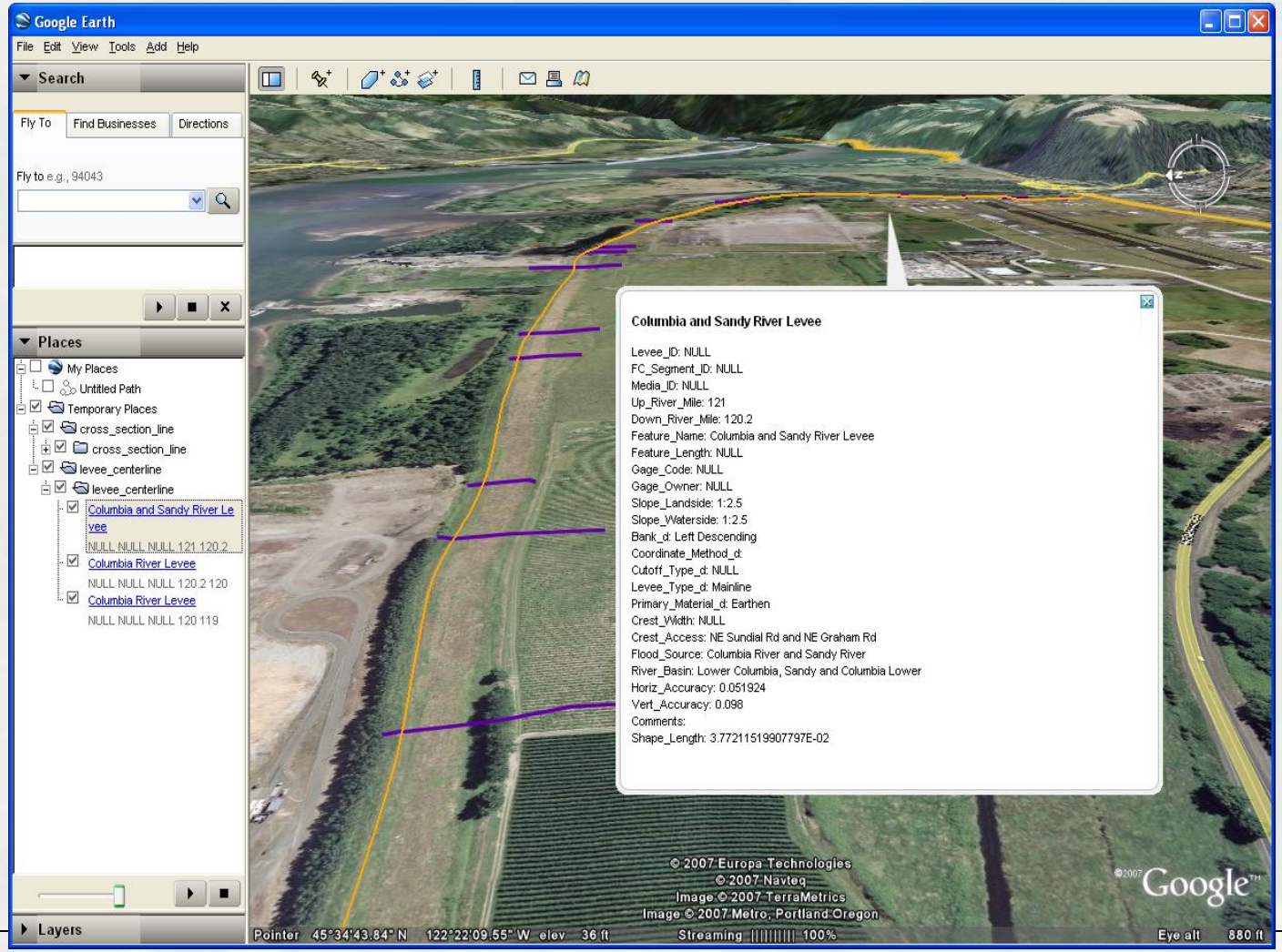
National Levee Database
Reports



District	System Name	Segment Name	Length Mi	Construct Start	Construct End	Non Fed Iei Date	Design Flow	Design Freq	Certification	Firm Protectio
LRL	Dayton LFPP	Dayton LFPP	1.5	-	13-OCT-81	-	-	-	-	-
LRL	Frankfort LFPP	Frankfort LFPP	.6	01-MAR-68	01-DEC-96	-	-	-	-	-
LRL	West Terre Haute LFPP	West Terre Haute LFPP	2.7	01-MAY-70	01-SEP-77	-	-	-	-	-
LRL	Harrisburg LFPP	Harrisburg LFPP	3.5	-	01-JAN-50	-	-	-	-	-
LRL	Brevoort/Vincennes LFPP	Vincennes LFPP	1.8	-	21-NOV-60	-	-	100	-	Yes
LRL	Golconda LFPP	Golconda LFPP	.9	25-JUN-40	03-JUN-46	-	-	-	-	-
LRL	Jeffersonville - Clarksville LFPP	Jefferson - Clarksville LFPP	4.1	01-JUL-40	19-OCT-49	-	-	-	-	-
LRL	Lawrenceburg LFPP	Lawrenceburg LFPP	3.4	01-MAY-40	01-SEP-44	-	-	-	-	-
LRL	Hawesville LFPP	Hawesville LFPP	.9	24-MAY-50	01-OCT-53	-	-	-	-	-
LRL	England Pond Levee	Mount Carmel LFPP	3	-	01-OCT-71	-	-	100	-	Yes
LRL	Sturgis LFPP	Sturgis LFPP	3.9	01-MAY-67	01-OCT-68	-	-	-	-	-
LRL	Brookport LFPP	Brookport LFPP	3.5	24-JUN-40	14-MAY-49	-	-	-	-	-
LRL	Covington LFPP	Covington LFPP	1.9	01-JUL-48	18-OCT-55	-	-	Flood Event of 1937	-	-

Examples of Current Corps Applications

National Levee Database
Google Earth

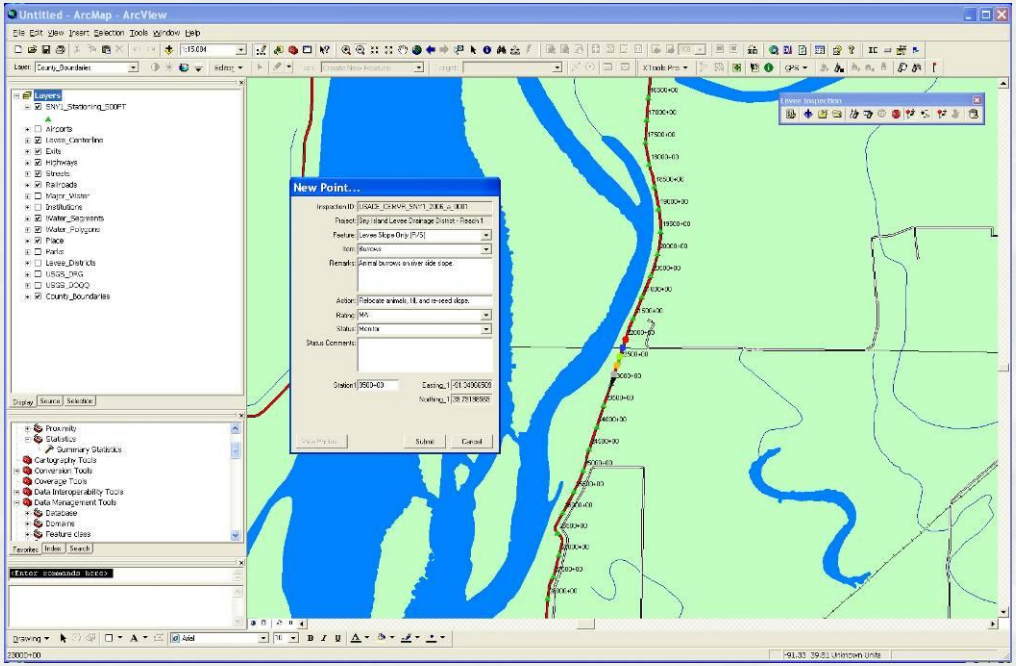


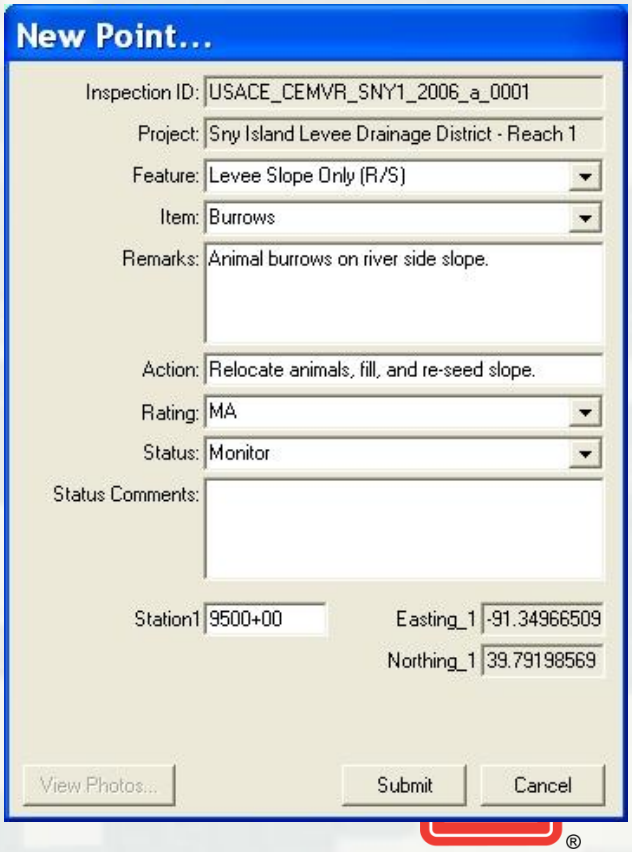
Examples of Current Corps Applications

Levee Inspection System

Capture Inspection Data in ArcMap

- Levee Inspector digitizes or uses GPS location to capture point or line data for items
- Record is Submitted to Database

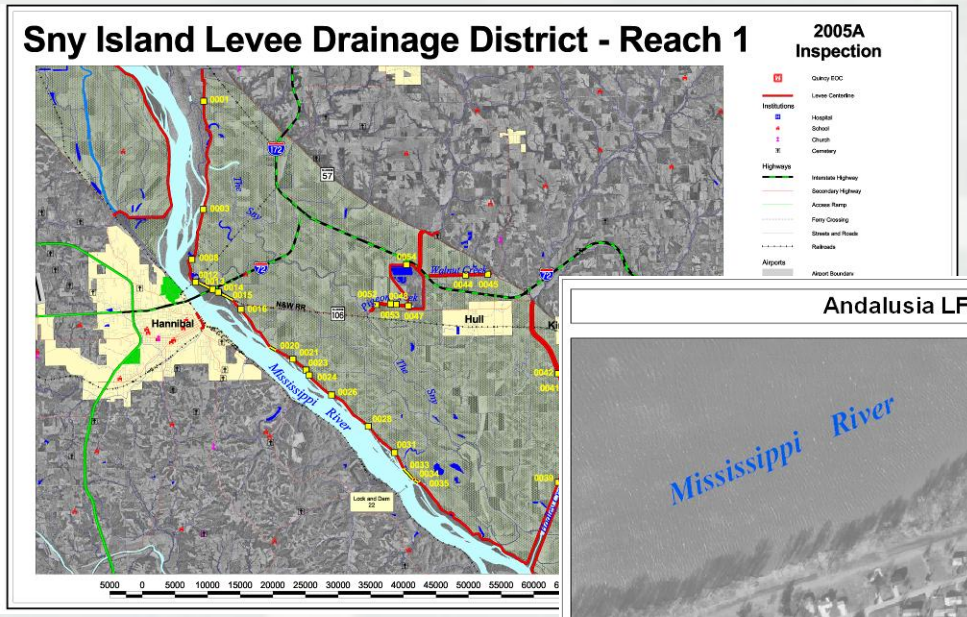


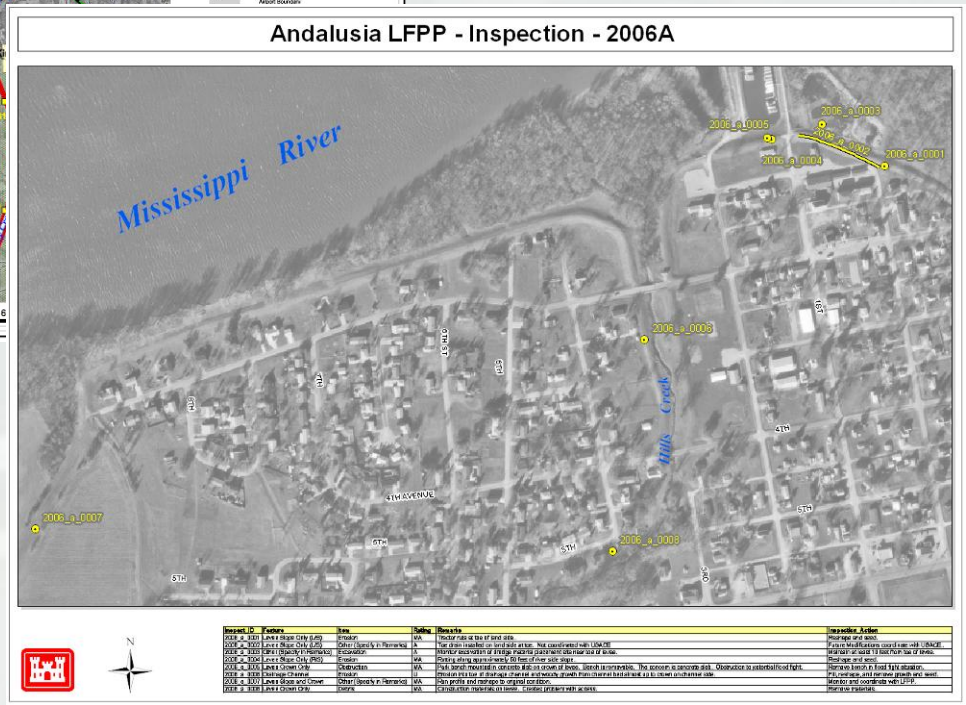


Examples of Current Corps Applications

Levee Inspection System

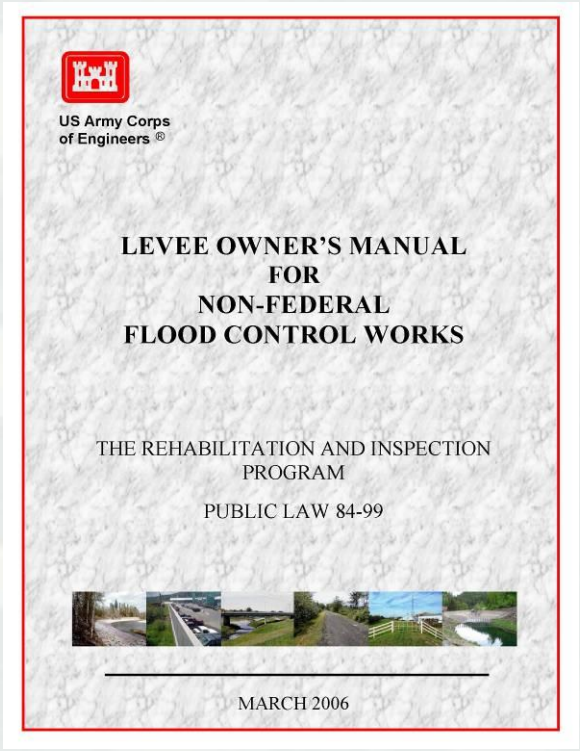
Map Creation





Examples of Current Corps Applications

Levee Inspection System
Reporting Tool

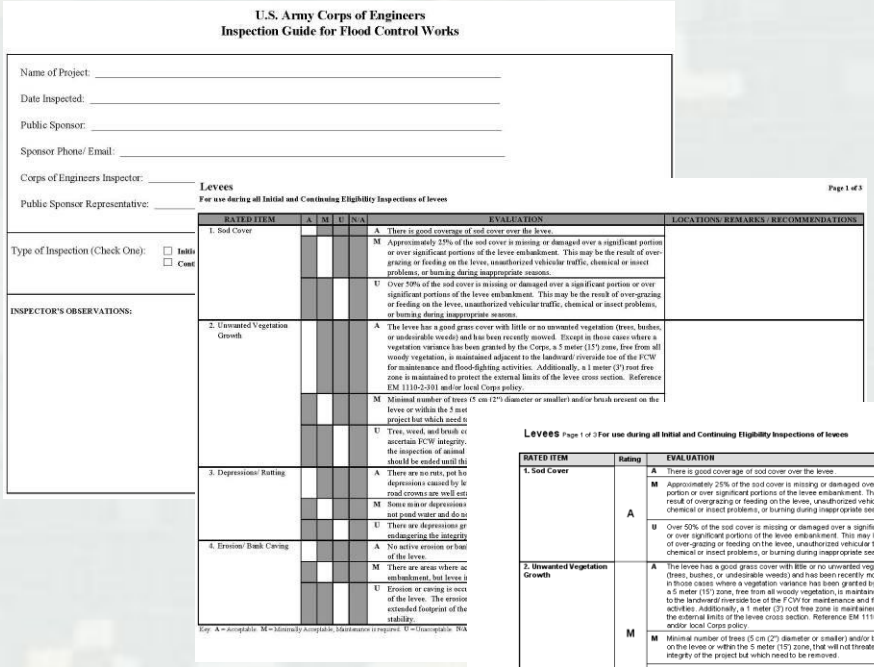

US Army Corps of Engineers ®

LEVEE OWNER'S MANUAL
FOR
NON-FEDERAL
FLOOD CONTROL WORKS

THE REHABILITATION AND INSPECTION PROGRAM

PUBLIC LAW 84-99

MARCH 2006


U.S. Army Corps of Engineers
Inspection Guide for Flood Control Works

Name of Project: _____

Date Inspected: _____

Public Sponsor: _____

Sponsor Phone/ Email: _____

Corps of Engineers Inspector: _____

Public Sponsor Representative: _____

Type of Inspection (Check One): ☐ Initi ☐ Cont

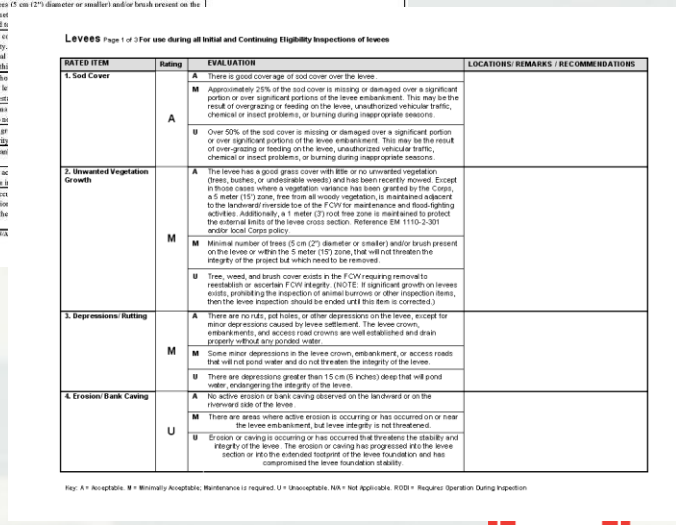
INSPECTOR'S OBSERVATIONS:

Levees
For use during all Initial and Continuing Eligibility Inspections of levees

Page 1 of 3

RATED ITEM	A	M	U	N/A		EVALUATION	LOCATIONS/ REMARKS / RECOMMENDATIONS
1. Sod Cover					A	There is good coverage of sod cover over the levee.	
					M	Approximately 25% of the sod cover is missing or damaged over a significant portion or over significant portions of the levee embankment. This may be the result of over-grazing or feeding on the levee, unauthorized vehicular traffic, chemical or insect problems, or burning during inappropriate seasons.	
					U	Over 50% of the sod cover is missing or damaged over a significant portion or over significant portions of the levee embankment. This may be the result of over-grazing or feeding on the levee, unauthorized vehicular traffic, chemical or insect problems, or burning during inappropriate seasons.	
2. Unwanted Vegetation Growth					A	The levee has a good grass cover with little or no unwanted vegetation (trees, bushes, or undesirable weeds) and has been recently mowed. Except in those cases where a vegetation variance has been granted by the Corps, a 5 meter (15') zone, free from all woody vegetation, is maintained adjacent to the landward/ riverside toe of the FCW for maintenance and flood-fighting activities. Additionally, a 1 meter (3') root free zone is maintained to protect the external limits of the levee cross section. Reference EM 1110-2-301 and/or local Corps policy.	
					M	Minimal number of trees (5 cm (2") diameter or smaller) and/or brush present on the levees or within the 5 met project but which need t	
					U	Tree, weed, and brush c ascertain FCW integrity. the inspection of animal should be ended until thi	
3. Depressions/ Rutting					A	There are no ruts, pot ho depressions caused by le road crowns are well esta	
					M	Some minor depressions not pond water and do no	
					U	There are depressions gr endangering the integrity	
4. Erosion/ Bank Caving					A	No active erosion or bank of the levee.	
					M	There are areas where ac embankment, but levee i	
					U	Erosion or caving is occu of the levee. The erosio extended footprint of the stability.	

Key: A = Acceptable. M = Minimally Acceptable, Maintenance is required. U = Unacceptable. NA


Levees Page 3 of 3 For use during all Initial and Continuing Eligibility Inspections of levees

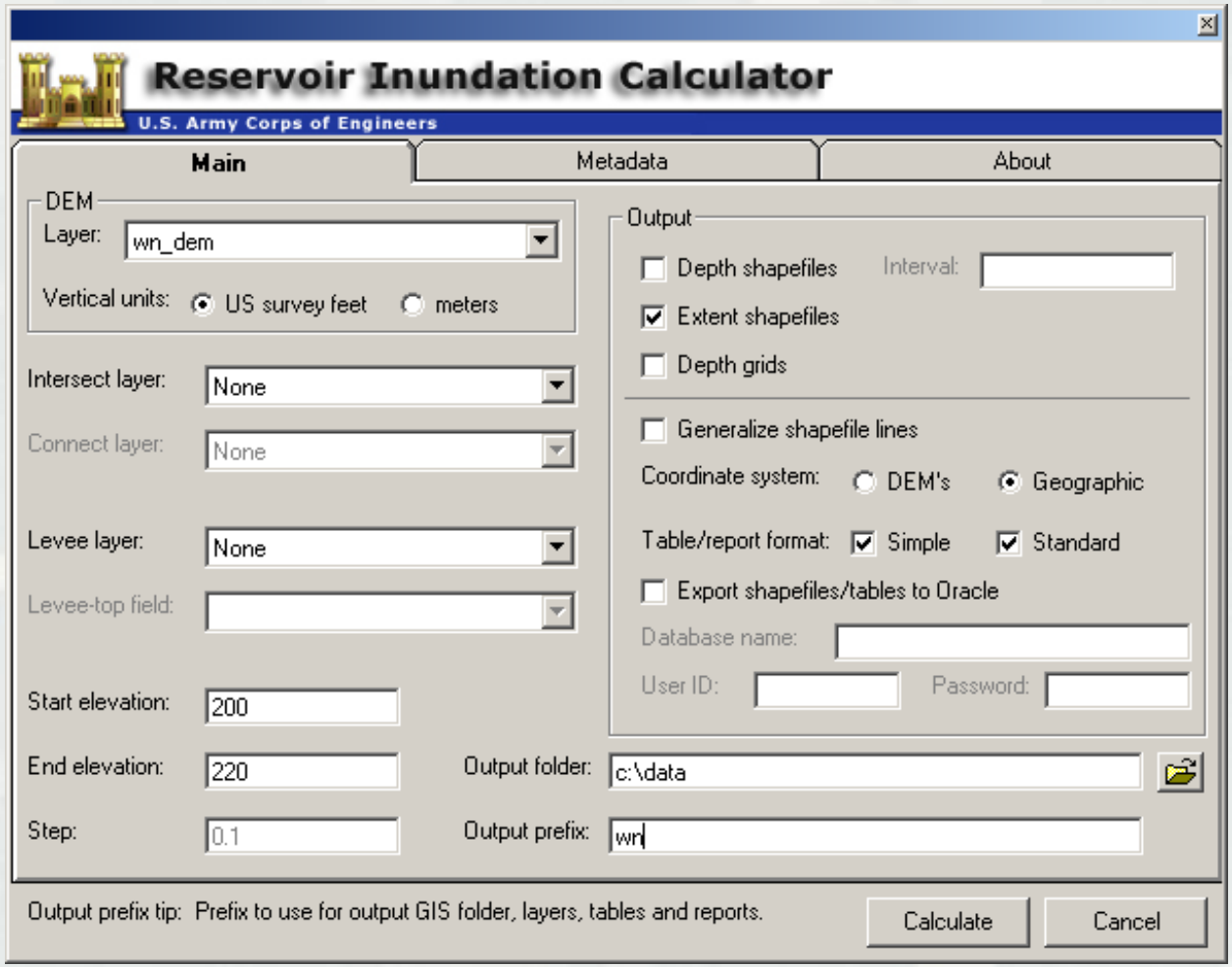
RATED ITEM	Rating		EVALUATION	LOCATIONS/ REMARKS / RECOMMENDATIONS
1. Sod Cover	A	A	There is good coverage of sod cover over the levee.	
		M	Approximately 25% of the sod cover is missing or damaged over a significant portion or over significant portions of the levee embankment. This may be the result of overgrazing or feeding on the levee, unauthorized vehicular traffic, chemical or insect problems, or burning during inappropriate seasons.	
		U	Over 50% of the sod cover is missing or damaged over a significant portion or over significant portions of the levee embankment. This may be the result of over-grazing or feeding on the levee, unauthorized vehicular traffic, chemical or insect problems, or burning during inappropriate seasons.	
2. Unwanted Vegetation Growth	M	A	The levee has a good grass cover with little or no unwanted vegetation (trees, bushes, or undesirable weeds) and has been recently mowed. Except in those cases where a vegetation variance has been granted by the Corps, a 5 meter (15') zone, free from all woody vegetation, is maintained adjacent to the landward/ riverside toe of the FCW for maintenance and flood-fighting activities. Additionally, a 1 meter (3') root free zone is maintained to protect the external limits of the levee cross section. Reference EM 1110-2-301 and/or local Corps policy.	
		M	Minimal number of trees (5 cm (2") diameter or smaller) and/or brush present on the levee or within the 5 meter (15') zone, that will not threaten the integrity of the project but which need to be removed.	
		U	Tree, weed, and brush cover exists in the FCW requiring removal to reestablish or ascertain FCW integrity. (NOTE: If significant growth on levees exists, prohibiting the inspection of animal burrows or other inspection items, then the levee inspection should be ended until this item is corrected.)	
3. Depressions/ Rutting	M	A	There are no ruts, pot holes, or other depressions on the levee, except for minor depressions caused by levee settlement. The levee crown, embankments, and access road crowns are well established and drain properly without any ponded water.	
		M	Some minor depressions in the levee crown, embankment, or access roads that will not pond water and do not threaten the integrity of the levee.	
		U	There are depressions greater than 15 cm (6 inches) deep that will pond water, endangering the integrity of the levee.	
4. Erosion/ Bank Caving	U	A	No active erosion or bank caving observed on the landward or on the riverward side of the levee.	
		M	There are areas where active erosion is occurring or has occurred on or near the levee embankment, but levee integrity is not threatened.	
		U	Erosion or caving is occurring or has occurred that threatens the stability and integrity of the levee. The erosion or caving has progressed into the levee section or into the extended footprint of the levee foundation and has compromised the levee foundation stability.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. RODI = Requires Operation During Inspection

Examples of Current Corps Applications

Reservoir Inundation Calculator

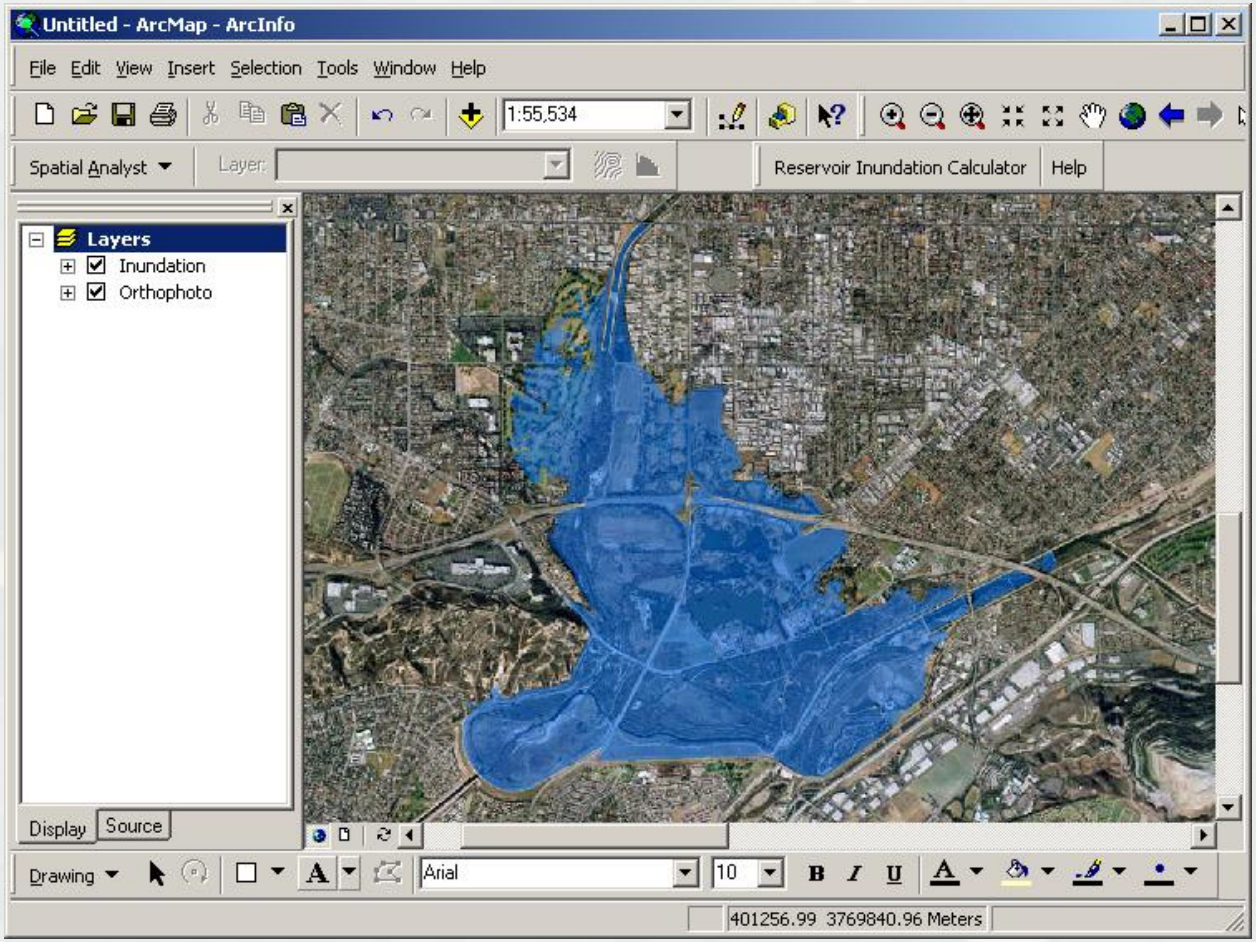
Functionality



Examples of Current Corps Applications

Reservoir Inundation Calculator

GIS Output



Customized Toolbar

Questions

Thank You

Stephen P. Gaughan

Physical Scientist

RS/GIS & Water Resources Branch

CRREL-USACE

7 April 2011